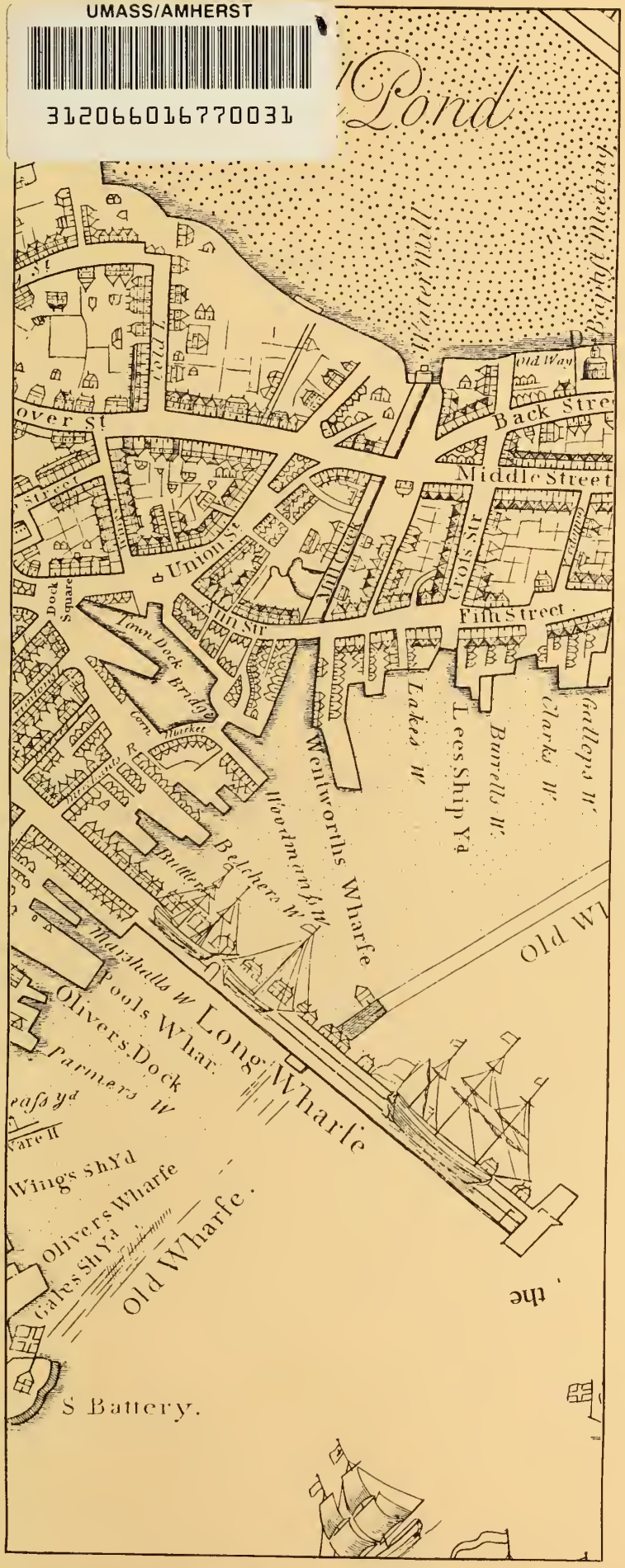


Archaeology of the Bostonian Hotel Site

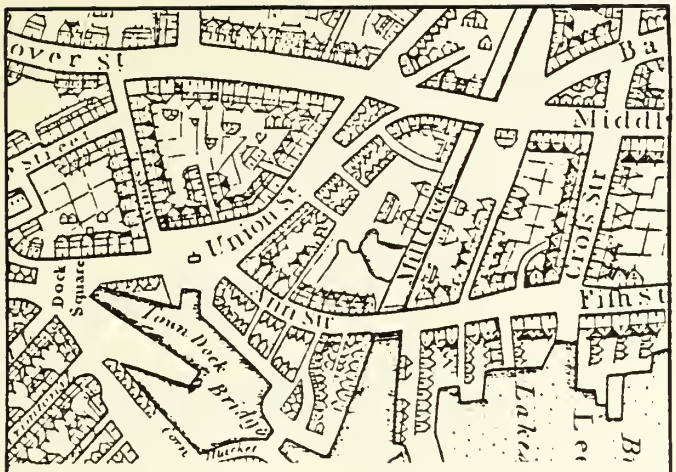
A project sponsored jointly by the Office of Secretary of State Michael Joseph Connolly, the Massachusetts Historical Commission, and the Winn Development Company

Occasional Publications in Archaeology and History
are published by the Massachusetts Historical Commission,
a Division of the Office of the Massachusetts Secretary of State,

Michael Joseph Connolly,
Secretary of State and Chairman, Massachusetts Historical Commission

Patricia L. Weslowski,
State Historic Preservation Officer

Valerie A. Talmage,
Executive Director, Massachusetts Historical Commission



Archaeology of the Bostonian Hotel Site

James W. Bradley, Neill DePaoli, Nancy Seasholes, Patricia McDowell, Gerald Kelso and Johanna Schoss

Massachusetts Historical Commission, *Occasional Publications in Archaeology and History #2.*

April 1983

Table of Contents

List of Maps

List of Figures

Introduction

During the winter of 1980-81, construction began for a new luxury hotel in downtown Boston. Although located in the historic center of the city, no archaeological survey work was done prior to the start of construction. A privately financed venture, the project was exempt from the environmental review procedures which are required for publicly funded or federally licensed projects.

Initially, the Massachusetts Historical Commission, as the state review agency, had no involvement with the project. Given the hotel's location, however, some of the staff members began informally to monitor the process of excavating the hotel's foundations. From the first glance, it was clear that major 17th and 18th century archaeological deposits were present. We had no idea at that time what the history of the area was or what kinds of deposits were being exposed. It was clear, both from the quantity of ceramic and organic materials and the relatively undisturbed contexts from which they came, that the site had important archaeological potential.

With the interest and assistance of Robert Harkness, one of the hotel's architects, and Yanos Nemath, construction supervisor for the Perini Corporation, we were allowed access to the site during the noon lunch break and were given permission to photograph and record the exposed profiles as well as collect artifact and soil samples. Between February and April, 1981, we visited the site almost daily in an attempt to keep up with the rapid pace of construction. These salvage efforts were encouraged by the Massachusetts Historical Commission and by Secretary of State Michael Joseph Connolly.

By May, a considerable quantity of data had been collected and a cursory review of the site's history completed. It was clear that the archaeological deposits were of sufficient value to warrant more careful and controlled examination. It was also clear that funding would be needed to properly process, conserve and analyze the artifacts which had been recovered. A decision was made to approach

the owner/developer of the hotel, the Winn Development Company, and to interest them in taking a more active part in protecting and interpreting the historical and archaeological aspects of the hotel's location. The approach used was a straightforward one: in exchange for funding and improved access to the site, we would provide good press coverage, historical information which could be used in the marketing of the hotel, and a display of our findings for the hotel lobby. It was our good fortune to deal directly with Arthur Winn, President of the Winn Development Company. Although initially skeptical and concerned about possible delays, his enthusiastic interest in the historic potential of the site turned a scrambling salvage into a useful exercise in urban archaeology. With his backing, the "field work" was able to proceed in a somewhat more ordered fashion. With a grant of $5,000, more detailed documentary research, analytical testing, and other amenities became possible.

Field efforts culminated in early November when the last major construction excavation on the site took place. By this time, we understood the site well enough to anticipate what might be uncovered - remnants of the ca. 1675 waterfront. With the assistance of Dr. Mary Beaudry and several of her graduate students from the Archaeology Studies Program at Boston University, and Beth Bower of the Museum of Afro American History, Boston, we were able to record several important profiles as well as the 17th century wharf amidst frenzied construction activities, abnormally high tides, and a blizzard of media coverage.

The success of the Bostonian Hotel site project is a reflection of the cooperation and sense of partnership which characterized the whole process. First and foremost, credit goes to Arthur Winn of the Winn Development Company and Secretary of State Michael Joseph Connolly, Chairman of the Massachusetts Historical Commission, who promoted and made possible this pioneering venture. By voluntarily working together, they demonstrated that development and preservation interests are not only compatible, but complementary. Thanks also go to Robert Harkness of Mintz Associates, Boston, and Yanos

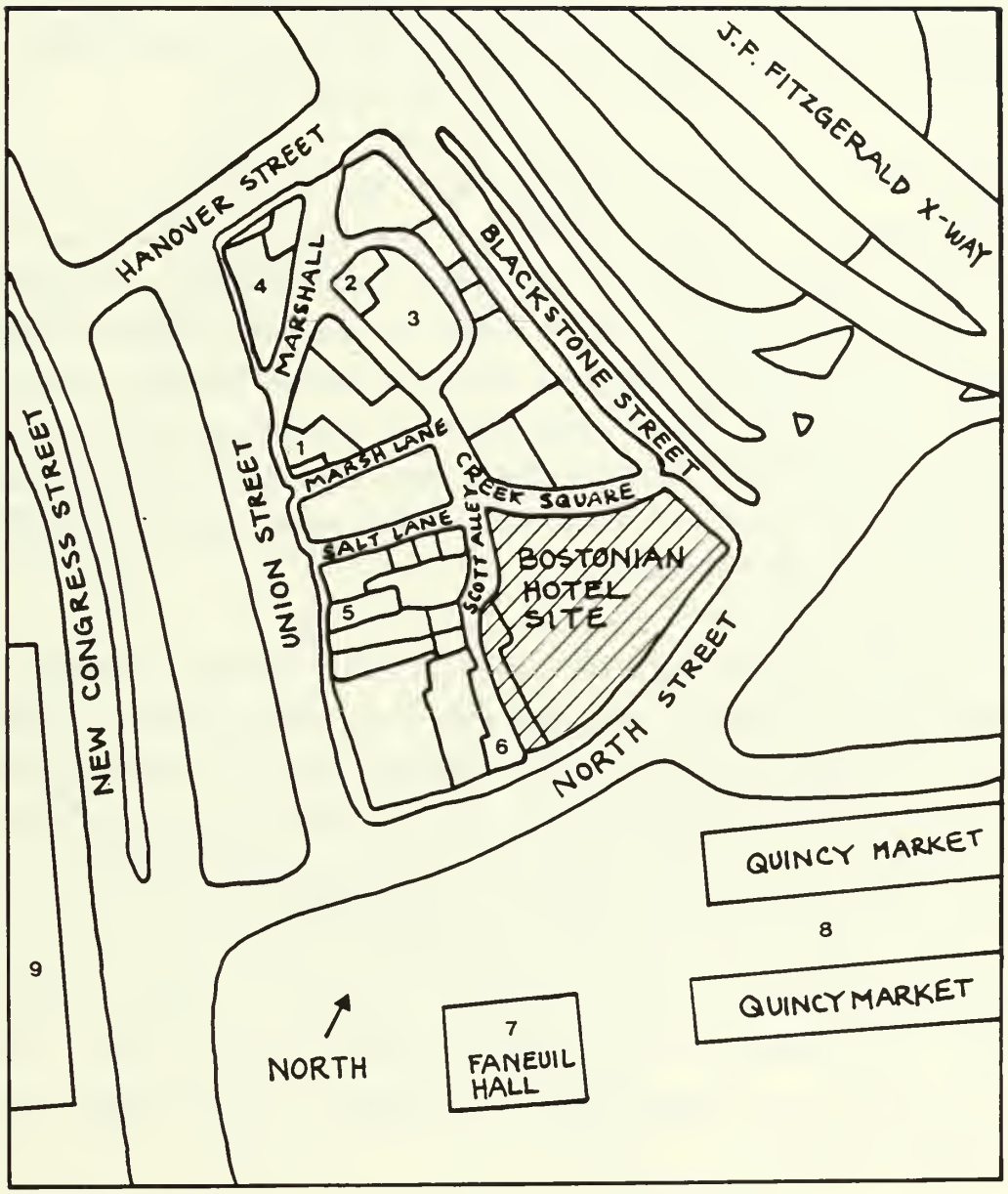
Nemath and Peter Rizzuto of the Perini Corporation for their support early in the project. Through the cooperation of Dr. Mary Beaudry, Department of Archaeology, Boston University, the materials from the site were processed and temporarily stored in the department's laboratory.

Others who provided important assistance include: Merry A. Outlaw (Virginia Center for Research Archaeology) and George Hamell (Senior Exhibit Designer, New York State Museum) for ceramic identification; Dean Nelson (Delaware State Museum) and Margaret A. Leveque (Museum of Fine Arts, Boston) for advice on artifact conservation; Ellen Starr (Secretary of State's Office) for preparation of many graphics and maps; and Caroline Hemans and Rebecca Herman for artifact illustrations and profile drawings. The authors would also like to thank: the Massachusetts Historical Society, and curator of documents Peter Drummey in particular, for permission to reproduce several of Samuel Clough's manuscript maps of Boston; and the Virginia Research Center For Archaeology for permission to reproduce figure 4 number 20 from a 1976 manuscript report by Edward A. Chappell titled: "Excavation of a circa 1690 Refuse Deposit at the Joseph Petitt Site on the Governor's Land, James City County, Virginia 1973."

This report is divided into five chapters. The first provides an overall description of the site and the thirteen profiles recorded. Written by James W. Bradley and Neill DePaoli of the Massachusetts Historical Commission, this chapter also summarizes the materials recovered and presents an initial interpretation of each profile. The second chapter, written by Nancy Seasholes, a doctoral student in the Department of Archaeology, Boston University, reviews the historical development of the site area based on documentary and map research. Chapter Three describes the chemical analysis of soil samples taken from selected profiles. Patricia McDowell, formerly of the Department of Geography, Boston University, and currently with the Department of Geography, University of Oregon, also reviews how these results may be interpreted. Chapter Four, an examination of

pollen samples from the site, is a collaborative work by Gerald Kelso, Department of Archaeology, Boston University and Johanna Schoss, a student in the program. The final chapter provides a brief reconstruction of the land use patterns which occurred on the site as well as summary recommendations for both further research and management.

The Blackstone Block
1980
(after Gomez-Ibenez 1977)



Map 1

CHAPTER I

SITE LOCATION AND DESCRIPTION

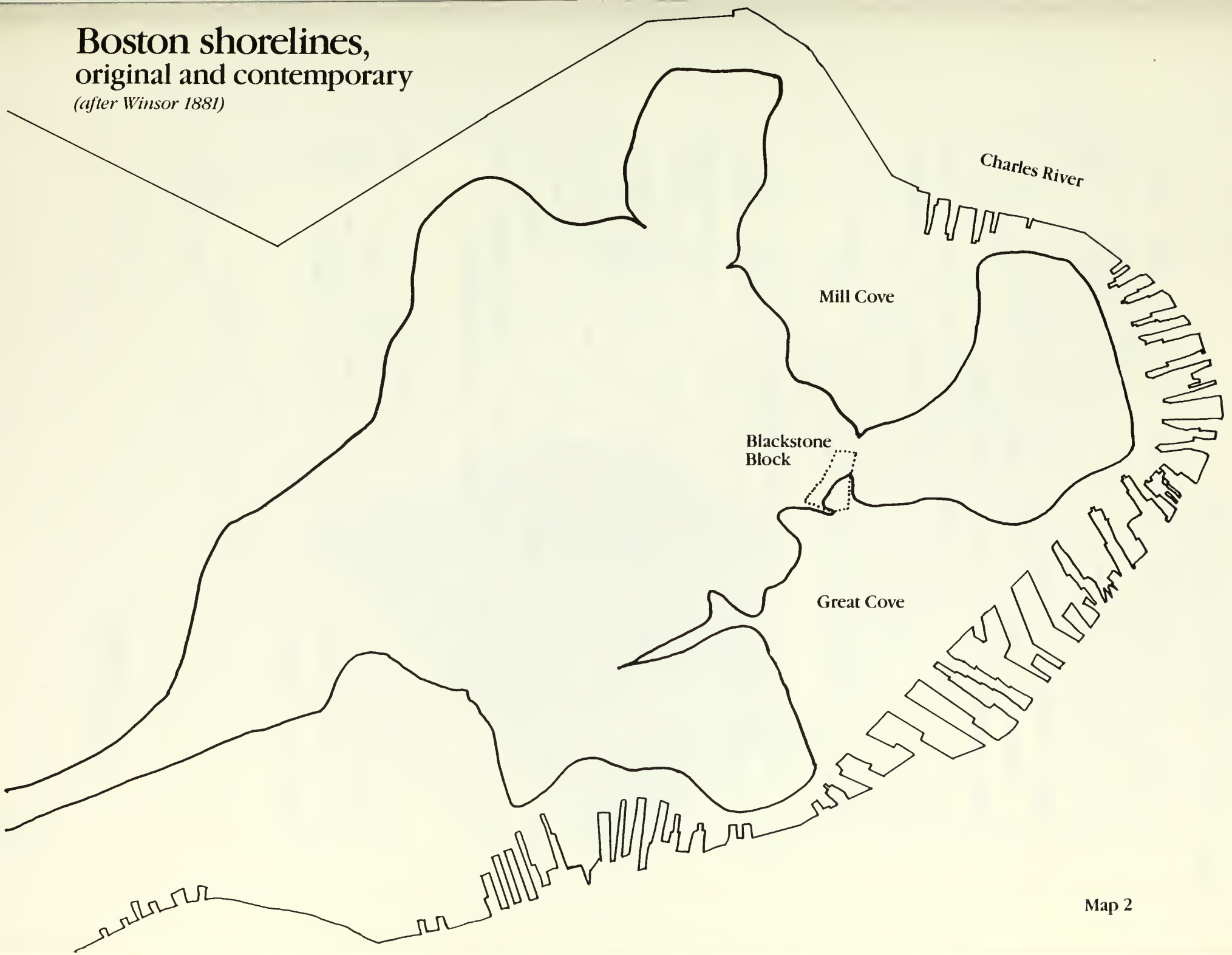
The Bostonian Hotel site is located on the southeast corner of the Blackstone block, just north of Faneuil Hall, in the center of historic Boston. See Map 1. The Blackstone block itself, with its 17th century street pattern and 18th to 20th century buildings, is a microcosm of Boston's urban past (Gomez-Ibanez 1977).

Although now some distance from the waterfront, this area straddles Boston's original shoreline. The site was located on what had been a small tongue of dry land (approximately present-day North Street) with adjacent tidal marsh to the north and northwest. At the far end of the Blackstone block, a narrow isthmus connected the main portion of Boston (the Shawmut peninsula) with another, smaller peninsula, now Boston's North End (see Map 2). This isthmus as well as the marsh areas may have been awash at high tides (Kaye 1976:6,45, and Figure 6).

As Boston grew during the 17th and 18th centuries, many of the marshes which surrounded the peninsula were filled in order to create new land. With few exceptions the evidence from the Bostonian Hotel site reflected various phases of this filling process. Thirteen profiles were recorded. Most were fill deposits dating between the mid 17th and late 18th century. In general, these profiles extended 12 to 15 feet below grade level. In every case, the upper 3 to 5 feet were profoundly disturbed by later building episodes or utility trenches. Beneath this, however, the earlier deposits were generally intact. Only one feature was encountered - a section of 17th century wharf cribbing in Profile K.

In many ways, this project did not follow normal field procedures. This was due primarily to the limitations of the salvage situation. Access to the site, for example, was permitted only during

Boston shorelines,
original and contemporary
(after Winsor 1881)



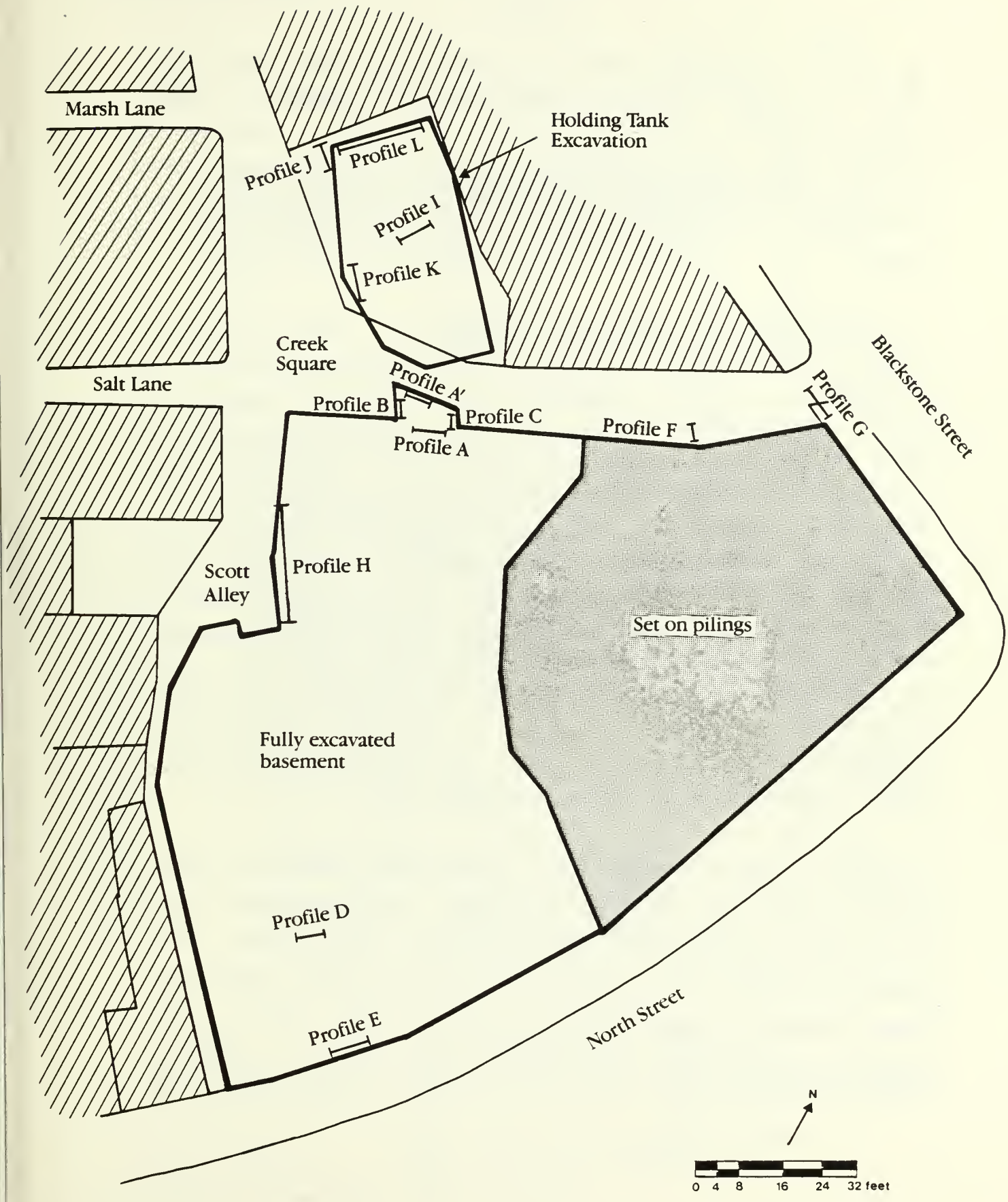
Map 2

the noon lunch break and at the end of the day. This, plus the rapid pace of excavation, made it nearly impossible to record and map in the usual systematic manner. As a result, we focused our efforts on three tasks: the first was to photograph and draw as many of the exposed profiles as possible; the second was to collect systematic soil and artifactual samples from the profiles; and finally, to collect artifactual samples from the backdirt piles, especially where these could be correlated with a specific profile. Clearly, this was not a sophisticated collection strategy, but we tried to record and recover everything we saw. This does place limits on the utility of the data collected, particularly since no random sampling was involved. Unfortunately, there were no other options.

Since it was not possible to map the site ourselves, we used the excavation contractor's plan of the site for recording profile locations. This plan also plotted the location for all the piers which were used in the hotel's foundations. These piers proved very useful, acting as a de facto grid system once they were in place. Using these piers as tie points, profiles were mapped onto the excavation plan with compass and tape (see Map 3). Similar difficulties were encountered when trying to standardize elevation readings. Without a transit, it was not possible to tie each profile elevation back to a benchmark. One final note - since the excavation plan was scaled in feet rather than meters, we also recorded measurement non-metrically.

What follows is a profile-by-profile review of the site. In addition to descriptions of the profiles themselves, brief summaries of the artifacts recovered are also presented. A synthesis of these profiles and a reconstruction of land use on the site is presented at the beginning of Chapter Five.

The Bostonian Hotel site, plan view



Map 3

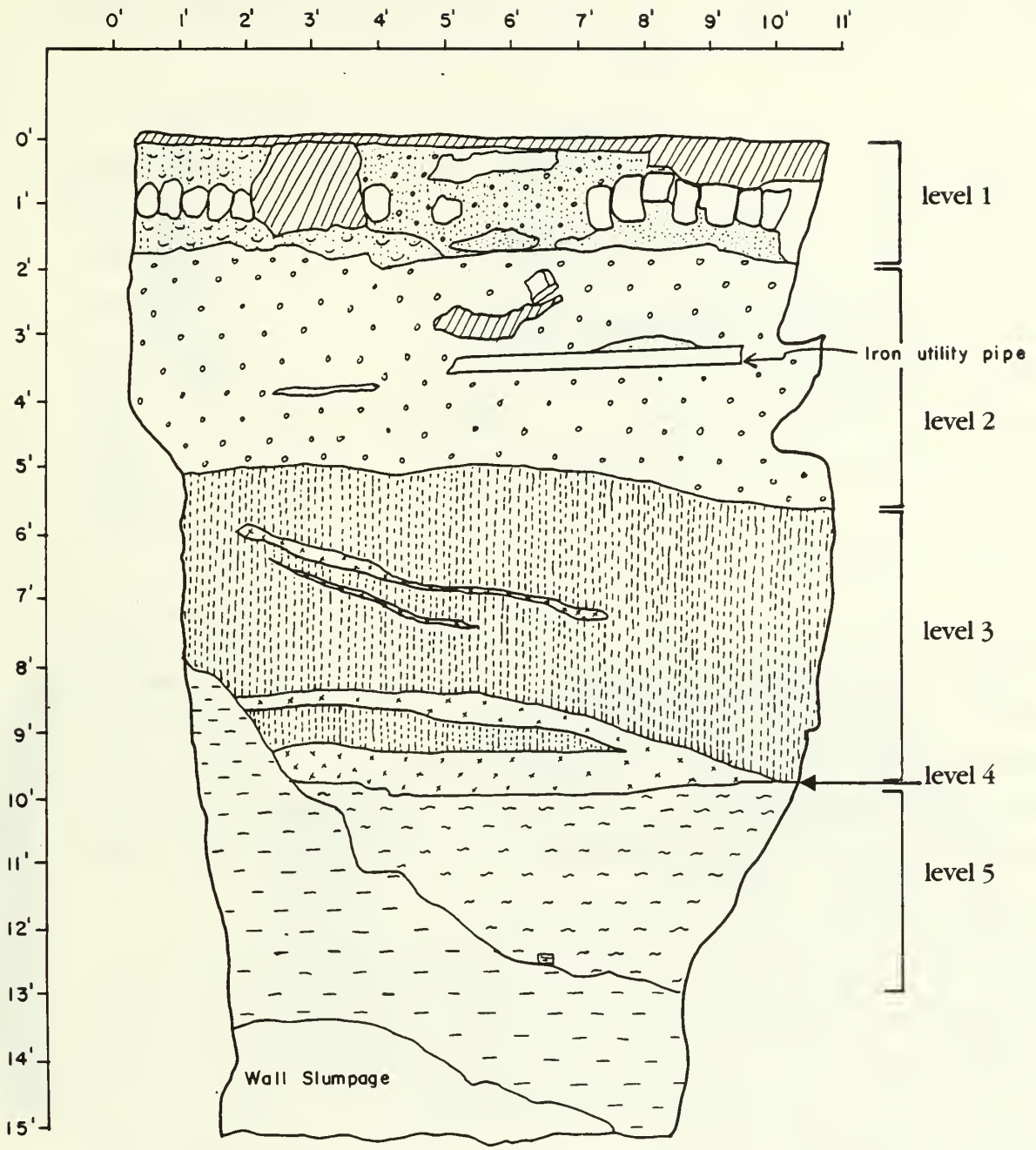
Profile A

Profile A, the first profile recorded on the site, was initially thought to be the remains of a large trash pit or filled well. Subsequent examination, however, indicated that it was a series of fill deposits which had been truncated on both the east and west sides by later building activities. This profile was recorded on the northwest side of the foundation excavation adjacent to Creek Square (see Map 3).

Five levels were identified (see Figure 1). Level 1 was composed of two varieties of paving. Uppermost was a thin layer of relatively recent asphalt; immediately beneath this was a layer of cut granite paving stones set in sand and probably dating from the middle of the 19th century. In several places these pavers were disturbed and overlain by pockets of olive to grey-brown clay fill. This fill was undoubtedly from level 2, which was composed entirely of this clay, and extended to approximately five feet below grade. The clay had probably been deposited as backfill during mid 19th century servicing or repairs to adjacent utility lines and cisterns. Boston Water and Sewer Commission records indicate that both a 3 ft. by 3 ft. wooden sewer and a 6 inch low pressure service water main were probably in service in this area by 1850-1860. Remnants of a wooden box sewer and a brick cistern were observed during excavations. No materials were collected from this level.

Level 3 was a dense deposit of dark brown organic fill which extended from five to ten feet below grade. A few fine lens of ash were present in and apparently contemporary with this fill. This level was extremely rich in artifacts, particularly ceramics, glass, and smoking pipes as well as faunal and other organic remains. Most appear to date from the late 17th and early 18th centuries. Artifacts tended to occur in dense pockets rather than be uniformly distributed throughout the level.

Profile A,
Looking North



Asphalt

Cut paving stones

Tan sandy fill

Blue/light brown clay

Ash/light grey sand

Dark brown organic fill

Orange-brown/yellow-brown fill

Olive brown fill

Sandy/clayey brown fill

Olive/grey-brown cistern fill

Milled plank

Figure 1

Ceramics included a broad range of types including domestic redwares, English refined earthenwares, delftwares and both English and German stonewares. By using South's ceramic dating formula (South 1977), the sample breaks down as follows:

Ceramic Type	Type Median Date	Sherd Count	Product
Iberian storage jar(38)	1710*	2	3420
Decorated delftware(49)	1730*	10	17300
Mottled ware(36)	1710*	5	8550
Buff earthenware(56)	1733	4	6932
Westerwald stoneware(44)	1738	4	6952
Westerwald stoneware(58)	1668	2	3336
Brown salt glazed stoneware mug(53)	1733	2	3466
		29	49956

*revised date estimate

This results in a sample date of 1723. There are, however, several problems with this estimate. First, the sample size is too small for reliable dating. Only 59% of the ceramics (29 of 49 sherds) were typable and could be used in the calculation. The other 20 sherds were glazed redwares, some of which were decorated in an unusual manner, including lunettes of applied slip and incising (see Figure 2).

A difficulty with South's ceramic dating formula is the inaccuracy or imprecision of median dates for several of the types. For example, Iberian storage jars (type 38) are assigned a median date of 1763. Several 17th or early 18th century examples are known from New England (Fairbanks and Trent 1982 II:235-36). Based on these, 1710 seems a more accurate median date. A similar situation exists with the "mottled ware" category. The examples from level 3 are all cylindrical tankard or mug fragments. Complete specimens of these mugs in the Museum of the City of London and the British Museum are dated between 1700-1710. The latter example (Reg. #1912,10-9.1)

Redware Rim Fragments,
from Profile A, level 3

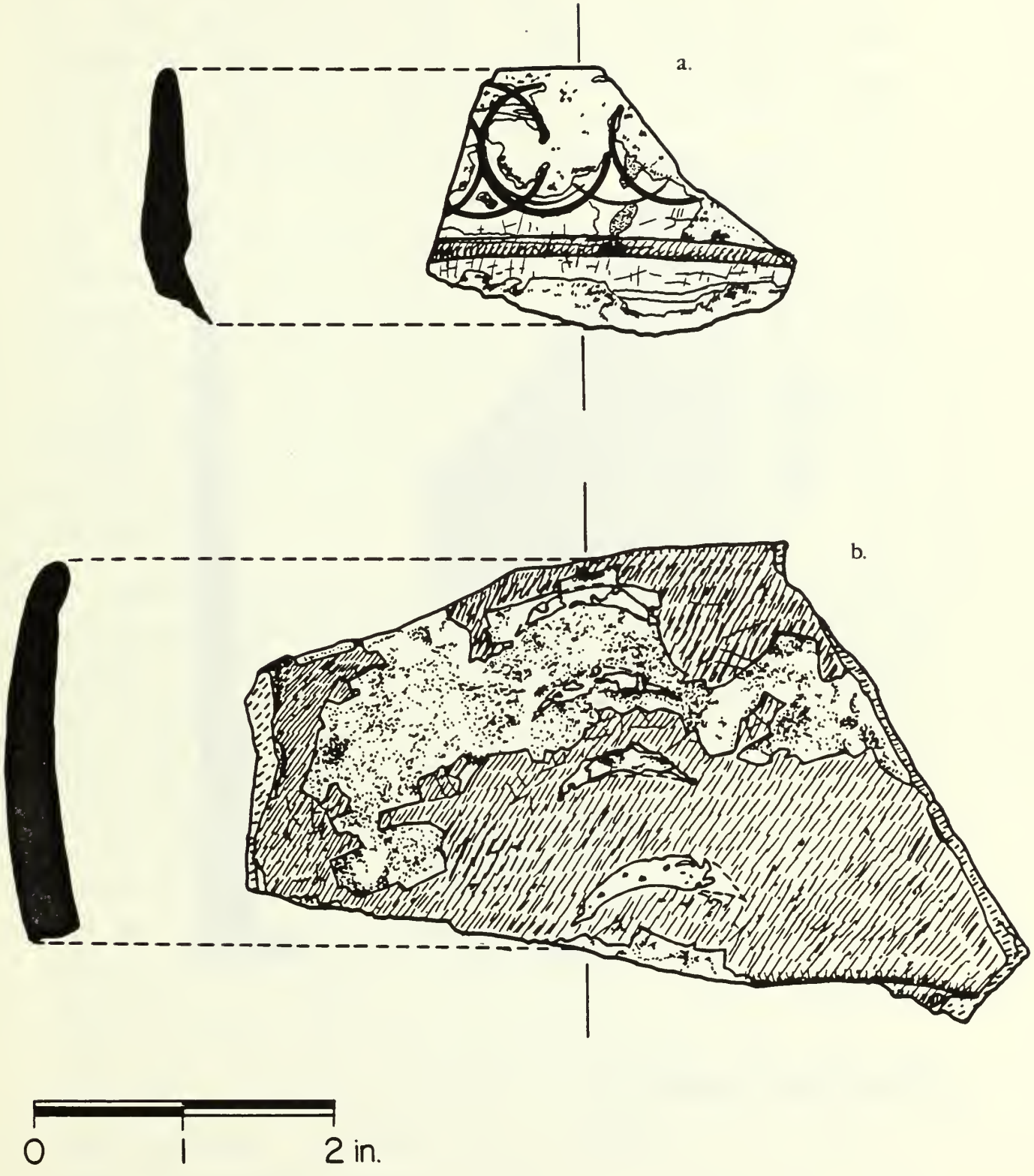


Figure 2

Stoneware Mug,
from Profile A, level 3

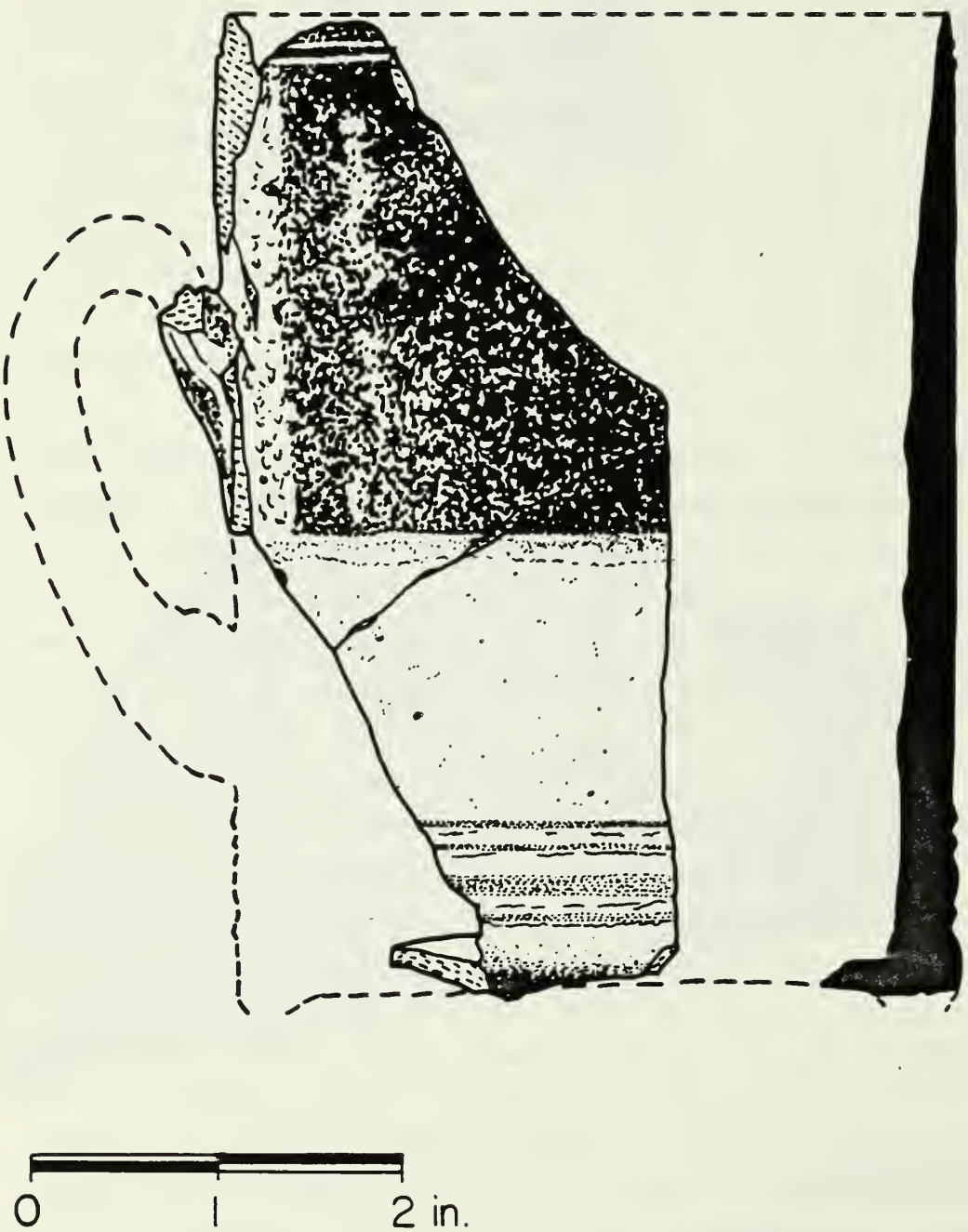


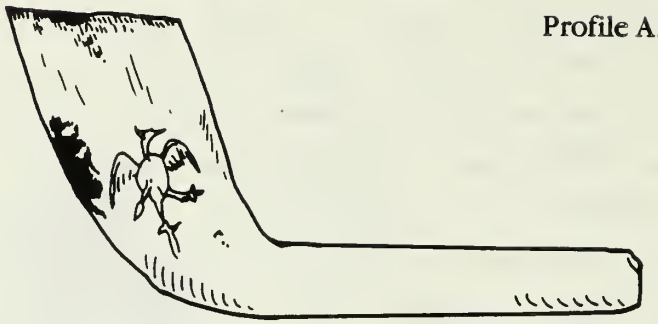
Figure 3

has the standard stamp of Queen Anne applied on one side just below the rim (Bimson 1970). Based on this evidence, 1710 would be a more appropriate median date for this particular ware than the rather generic date of 1755, which is used for all "Clouded, Tortoise shell and mottled wares." Similar problems of imprecision undoubtedly affect other ceramic types. This is especially evident for the lead glazed combed yellow slipware (buff earthenware) category and for decorated delftwares. For the latter category, a median date of 1750 seems too late for a deposit which contains no creamware, white salt glazed stoneware or other diagnostic mid 18th century material. As a result, a median date of 1730 is used for decorated delftware. Several of the delftware pieces from level 3 were from a blue and white bowl with polychrome floral motifs on the side panel. A vessel with very similar shape and decoration was illustrated in Antiques May 1, 1981:1097 with a 1720-1740 date range. Also reconstructable in terms of its profile was a brown glazed English stoneware mug which could be of either English or colonial manufacture (see Figure 3).

Several smoking pipe fragments were also recovered from level 3. The forty-two specimens had the following breakdown by stem bore diameter: 2(4/64), 22(5/64) and 18(6/64) which produce a sample date of 1726. Included among the pipes were two marked bowls. One was a 5/64 bore diameter pipe with the letters I and R molded on either side of an otherwise plain heel (see Figure 4b). While this mark has yet to be identified with a specific maker, the use of letters on the side of the heel was a popular tradition in the London area (Walker 1971:81; Atkinson 1965:253-55). Oswald lists several 17th and early 18th century London pipe makers with the initials IR, but none are noted as exporters (Oswald 1975:144). The second marked pipe had a 6/64 diameter stem bore and was heelless. Molded in relief on the left side of the bowl was an eagle or other bird (see Figure 4a). At present, no information is available on this mark. Of the eight other unmarked pipe bowls, only two have heels (both of which are plain). The other bowls are heelless and very similar in shape to the example depicted in Figure 4a. It should also be noted

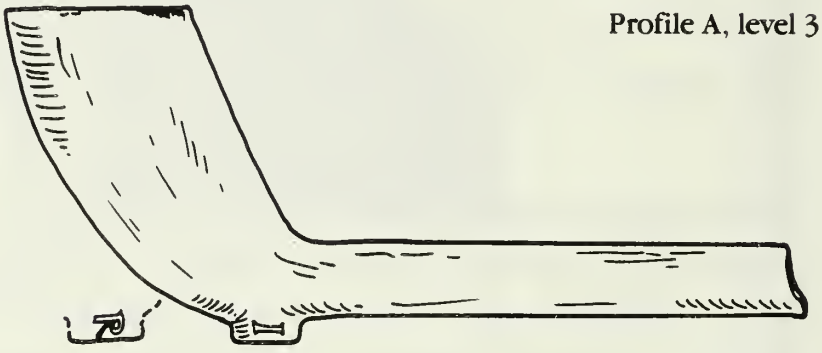
Smoking Pipes

a.



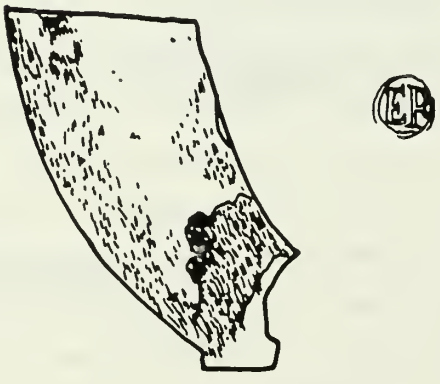
Profile A, level 3

b.



Profile A, level 3

c.



Profile A, level 5

Figure 4

that many of these pipes show no evidence of use and may have been discarded as damaged merchandise.

Bottle glass was also common in level 3. Many of the forty-nine pieces recovered appear to come from one crushed bottle. Though not completely reconstructable, this somewhat globular, short-necked bottle is closest in form to Noel Hume's 1722 example (Noel Hume 1969:64).

Finally, level 3 contained a considerable amount of organic material. This included faunal remains, primarily domestic cow (Bos taurus) and sheep (Ovis aries), as well as bird and shellfish (Mercenaria). Also present were shoe pieces (insoles) and leather scraps, plus a variety of wood debris (hewing waste, bark, branches and sticks). Several examples of building materials, especially large orange-red bricks and mortar/plaster pieces, were also recovered.

Level 4 was a thick lens of light grey ash and sand located at the base of, and to some degree grading into, the dark brown fill of level 3. It contained few artifacts and some of those recovered showed evidence of having been burned. Only two ceramic pieces were found, part of the base of a mottled ware tankard and a fragment of a small molded and painted ball clay figurine. Two pipestems, both with a 5/64 stem bore, and a pipe bowl were the only other artifacts recovered. The pipe bowl was marked wth the letters I and R on either side of the heel. Aside from a larger stem bore (7/64), it was identical to the one found in level 3.

Level 5 was a medium brown clay fill with sandier pockets throughout. It ranged from 10 to 13 feet below grade and was the deepest evidence of cultural activity evident in the profile. The level also contained very few artifacts. The only ceramic was a cordoned and cobalt decorated neck of a typical mid 17th to early 18th century Rhenish stoneware jar. One pipe was also recovered. It had a 6/64 stem bore, a plain heel and the letters ER within a concave circle impressed on the back of the bowl toward the smoker (see Figure

4c). Similar ER pipes have been found from other early 18th century contexts (Walker 1971:80-81). Oswald lists two possible pipemakers, both exporters, who may have used this mark: Edward Randell (1) 1668-89, and Edward Randell (2), 1699 (Oswald 1975:157). At the very base of level 5 was a sawn, apparently waterlogged, plank and a badly corroded iron nail or pin.

In summary, Profile A represents two, or possibly three, fill episodes from the late 17th and early 18th century. While subsequent utility lines and building activities have altered or destroyed the upper portion, levels 3 through 5 were undisturbed prior to excavation.

Profile A'

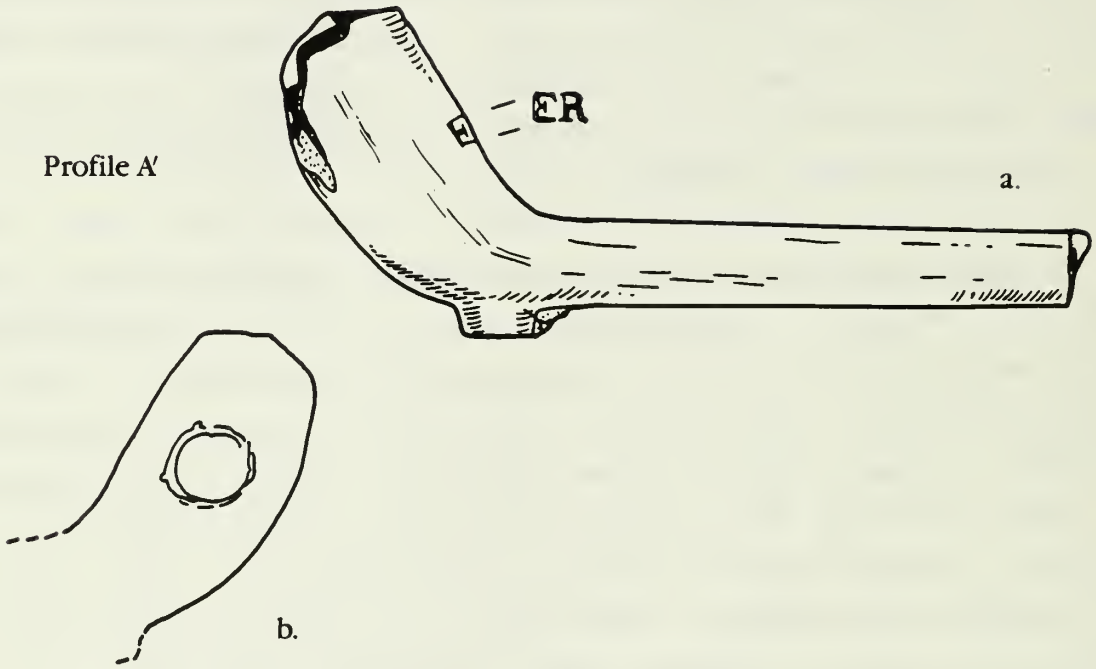
Profile A' (prime) was recorded directly behind (north northwest of) Profile A when the foundation excavations were extended. While Profile A' appeared to be very similar to Profile A, it was not possible to obtain accurate measurements. Due to slope instability and the threat of slumpage, this profile was shored with heavy gauge sheet steel before it could be recorded. Only the lowermost 13 inches of the profile remained visible.

This visible portion was a dark brown organic fill identical to level 3 of Profile A. It extended to a depth of 12 feet below grade and rested directly upon the underlying blue marine clay. Despite limited collection, this level was clearly rich in materials. Ceramics included: seven pieces of glazed undecorated redware, three pieces of blue and white delft, three large pieces of combed buff earthenware, a single Rhenish stoneware body fragment and several pieces of a mottled ware tankard. Most notable was a small tin glazed earthenware dram cup or porringer with the letters A^{O}Y painted on the interior (see Figure 6). While several opinions on the origin of this unusual piece have been expressed (Fairbanks and Trent 1982 II:244-45), no convincing identification has yet been made. Norman Weiss, however, has recently pointed out that very similar vessels, which apparently were used as wine tasters, have been recovered from French sites in Canada.

Nine smoking pipe fragments were also recovered from this level. With a stem bore diameter breakdown of 7(5/64), and 2(6/64), these pipes produce a sample date of 1732.9. There was one marked pipe; it had a 5/64 diameter stem bore, a plain heel and a doubly marked bowl. A raised blank circular medallion was located on the right side of the bowl while the letters ER were impressed on the back of the bowl toward the smoker (see Figure 5a). This pipe is similar to ones made by the Tippett Family and may represent Bristol pipemaker Edward Reed (1706-22) who had apprenticed with the Tippetts (Walker

Smoking Pipes

Profile A'



a.

b.

Profile C, level 5

c.

Figure 5

Tinglazed Cup,
from Profile A'

Figure 6

1971:80-81). The four other complete and partial bowls were from heelless, unmarked pipes. Like the similar pipes from level 3 of Profile A, several of these pipes showed no evidence of having been smoked.

Other material collected from this level included: faunal remains (probably Bos), wood shavings, cherry pits, small scraps of leather, brick fragments, and several small pieces of water-worn flint nodules, probably discarded ballast.

In summary, Profile A' appears to represent the same fill episode as seen in level 3 of Profile A. The artifacts suggest an early 18th century date.

Profile B

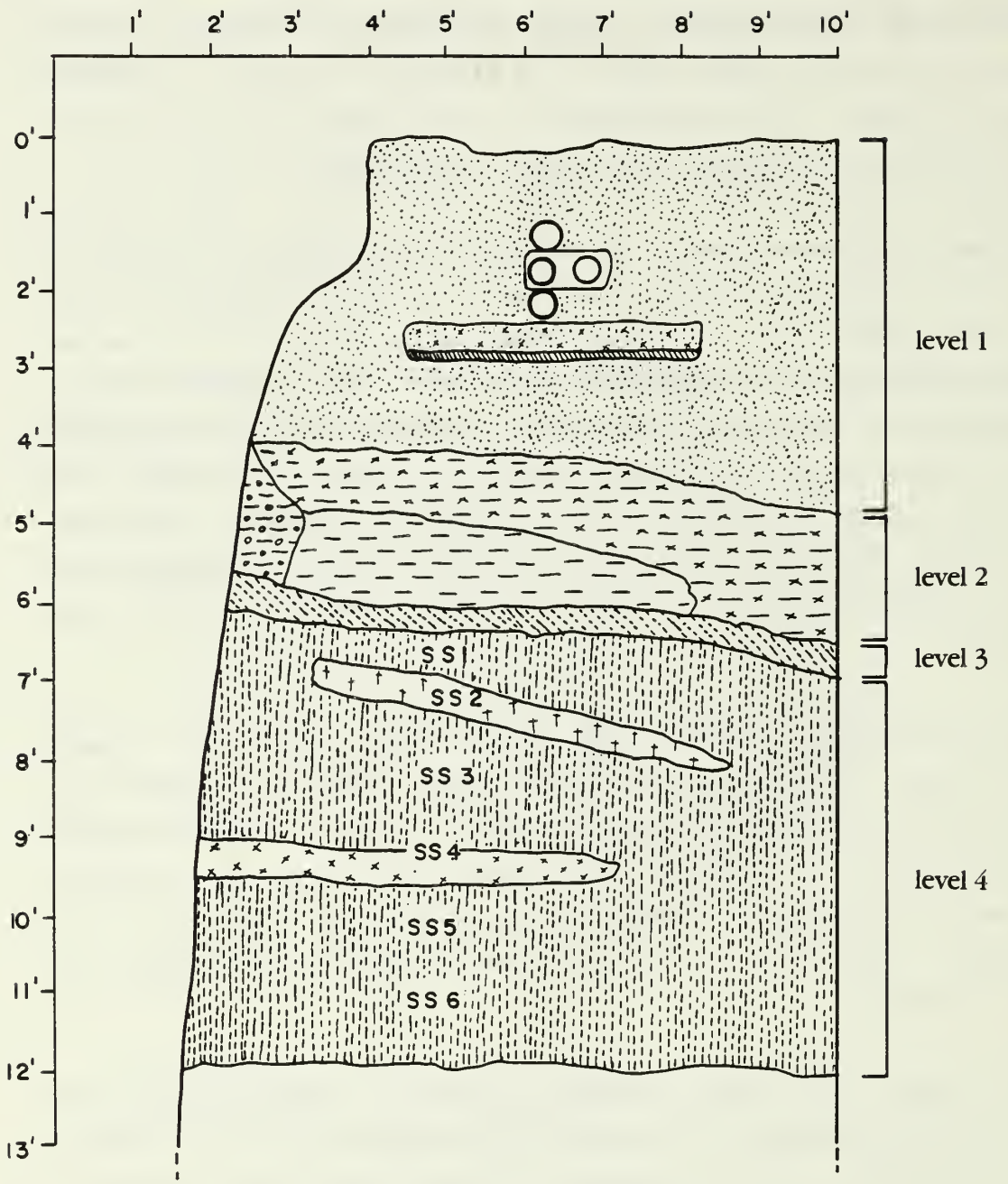
Profile B was exposed as machine excavations removed Profile A. Located on the east facing wall of the extended excavation, Profile B provided another, but perpendicular, cross section of the same fill deposit as had been exposed in Profile A (see Map 3).

Four levels were present in this profile (see Figure 7). Level 1 was a thick deposit of yellow-brown sandy fill which extended to four feet below grade. Several utility lines were present in this level as well as two lens of dark gray and mixed clay fill, apparently related to the lying or repair of these lines. Although the soil description from this level differs somewhat from that of level 2 of Profile A, the two levels appear to be related and possibly contemporary. Although not present when this profile was recorded, Profile B undoubtedly had the same two paving episodes as were present in level 1 of Profile A.

Two levels lay between the 19th century utility line trench (level 1) and the dark brown organic 18th century fill (level 4). The first of these (level 2) was a complex series of deposits which included pockets of blue clay, olive-brown clay and ash. Beneath this was a thin layer of medium-brown sandy fill (level 3). Unfortunately, both were out of reach and therefore not sampled for cultural material.

The major, and most accessible, portion of Profile B was level 4, a dark brown organic fill deposit which extended from six to twelve feet below grade. Level 4 included two large lenses, one of plaster, the other ash, and was characterized by numerous subtle changes in texture and content. Resting directly on the underlying blue marine clay, this appears to have been the same deposit as had been noted in Profile A (level 3) and Profile A'. In contrast to the collection of materials from the other two profiles, the emphasis for Profile B was on systematic sampling throughout level 4. Six soil samples were

Profile B,
Looking West



Pale yellow-brown sandy fill

Blue clay/ash mix

Olive-brown/blue marine clay

Utility lines

Blue marine clay

Dark brown organic fill

Orange-brown ash fill

Medium brown sandy fill

Plaster

Dark grey

Ash fill

SS1-SS6 — location of soil samples collected

Figure 7

collected at one-foot intervals from the base of the deposit to the top. In two instances, the one-foot interval was varied so that samples of the two large lenses could be included. The soil samples collected (approximately two pounds each) were processed for both large and small artifacts. All these samples were analyzed for soil chemicals; soil sample #6, taken from the base of the level, was also analyzed for pollen.

Soil sample #1, collected at a depth of 6½ feet below grade, contained two ceramic pieces (combed buff earthenware and blue on white delft), one pipestem (9/64), and several fragments of building materials, primarily brick, mortar, and a piece of window glass. Also present were wood fragments and numerous water-worn pebbles. Analysis for soil chemicals indicated fairly high levels for several metals, in particular zinc, copper, iron and aluminum. These metal ions may have been leached from the overlaying fill levels. Soil chemistry analysis is discussed in more detail in Chapter Three and the analytic data presented in Appendix A.

Soil sample #2, collected at a depth of 7 feet 2 inches below grade, was taken from the plaster lens. It was composed primarily of plaster and numerous small pieces of wood (lathe?). Also included were one pipestem (5/64) and a piece of split bone. This sample had very unusual chemistry characteristics compared to the other samples from the profile.

Soil sample #3 was collected from 8 feet below grade. It contained several small fragments of bottle glass, two glazed but undecorated pieces of redware, and the brown glazed handle of a refined earthenware vessel. This sample also included a considerable amount of organic material: leather scrap and a shoe fragment (a composite leather heel), faunal remains (both unidentified mammal and fish), shellfish (hard clam and oyster) and plant remains (cherry pits and walnut shells), plus twigs and other wood fragments. Sample #3 was

relatively high in phosphorus, additional evidence for the presence of organic waste. Zinc, copper, manganese and lead were also present at relatively high levels.

Soil sample #4, collected from the ash lens, was nine feet below grade level. There were very few materials in this level, which contained some charcoal and calcined bone as well as ash. A few pieces of bark and unburned wood plus one pipestem (5/64) were also included. This sample had chemical characteristics similar to another ash layer on the site - Profile D, level 6 (see below). Both had moderately high levels of phosphorus, potassium, magnesium, zinc and manganese, and low levels of copper, iron and aluminum, compared with other samples from the same profile. These ash deposits appear to be domestic hearth refuse. This ash lens may be part of the same deposit which was recorded as level 3 in Profile A.

Soil sample #5 was collected from 10 feet below grade. It contained two ceramics (redware and mottled ware), brick fragments, oyster shell, bone fragments, and a peach pit. This sample had relatively high levels for elements associated with marine peat - potassium, calcium, magnesium and manganese (see Chapter Three). These values were not as high as were recorded from soil sample #6, however.

Soil sample #6 was collected at a depth of 11 feet below grade, one foot up from the base of the deposit. Only one ceramic fragment was included in the sample, a piece of green glazed redware. Two other ceramics, exposed in the profile at this same level, were also collected: a base fragment from a buff earthenware cup and a body piece of scratch-decorated "Hohr" gray stoneware. Other materials present in soil sample #6 included one pipestem (6/64), the neck of a squat globular bottle (most similar to the very short-necked, late 17th century styles illustrated by Noel Hume 1969:63), pieces of brick and plaster, and a wide range of organics. Among these were several cherry pits, a few seeds (pumpkin or squash?), leather scrap, mammalian and fish bones, as well as bark and small branches. Of the

several shellfish remains present, the fragmentary pieces of oyster shell probably represent human consumption. The other small bivalves and gastropods were inhabitants of an intertidal zone characterized by both a soft muddy bottom and a hard substrate such as wharf timbers or rocks. (See Appendix C for a more detailed description of the species present and their environmental tolerances.)

The soil chemical analysis from sample #6 reflected the highest values for potassium, calcium and magnesium of any of the samples taken from Profile B. This, plus moderately high levels of iron, manganese and aluminum, suggest that some marine peat was present in this portion of level 4. Moderately high values were also recorded for zinc and lead. These appear to reflect human waste disposal.

The results of the pollen analysis of soil sample #6 indicate the presence of mixed deciduous/coniferous forest including: oak (16%), pine (12%), birch (6%), maple (3%) and beech (2%). The dominant non-arboreal pollen types included: grasses (19%) and low-spine compositae which include ragweed (11%). These data suggest the presence of stabilized, well drained soils, and possibly active salt marsh, in close proximity to the area of deposition. (See Chapter Four and Appendix D for additional information.) A final note of interest: pollen analysis of this sample also revealed the presence of Old World cereal grasses (wheat, oats, barley or rye) at about 3% of the total pollen count.

Despite its superficially homogeneous appearance, analysis of the six soil samples for level 4 indicates considerable variety and differentiation. Artifactually, all six samples are similar and contain materials dating to the late 17th or early 18th century. Chemically, however, there are distinct differences from sample to sample. This not only suggests that many depositional episodes were involved in the creation of level 4, but that the filling may have been fairly rapid as little leaching or mixing seems to have taken place.

While this reconstruction may explain much of the formation of level 4, the basal portion of the deposit appears to present a different situation. The absence of an undisturbed post-Pleistocene peat layer, and the presence of peat elements in the lower two samples (#5 and #6), suggest that this area had been dredged. Historical research has confirmed mid 17th century "enlargement" of the original marshy embayment as part of the construction of a commercial waterfront (see Chapter Two). The presence of active mollusks suggests that the initial process which produced level 4 was one of gradual accretion.

In summary, Profile B represents a filled section of Boston's 17th century waterfront. The area had apparently been dredged to the underlying blue marine clay during the mid 17th century and may have been redredged at a later date. The earliest cultural deposits suggest gradual filling by accretion during the late 17th or early 18th century. At some slightly later point, the area appears to have been systematically, if not deliberately, filled, raising the ground level at least three to four feet. This deposit was in turn overlain by additional but untested fill levels, the upper portions of which had been destroyed by 19th century utility trenches.

Profile C

Profile C was located directly opposite Profile B on the west facing wall of the extended foundation excavations (see Map 3). Six levels were recorded (see Figure 8). Level 1 was composed of a sequence of asphalt pavements. Below this was an earlier paved surface of cut granite block (level 2). Both these levels were very similar to those recorded in level 1 of Profile A.

Level 3 consisted of a light brown/orange fill which extended to a maximum of six feet ten inches below grade. Near the base of this level was a brick and slate drain similar in style to those used during the third quarter of the 19th century. No materials were collected from this level.

Level 4 was a sandy grey brown fill, the upper portions of which were apparently disturbed by the drain construction in level 3. This level ranged from roughly two to three feet in thickness and extended to eight feet ten inches below grade. Materials were generally sparse and represented a broad time range. They included five ceramic fragments: two pieces of glazed undecorated redware, a rim-to-foot section of a small white salt glazed stoneware bowl, a manganese and cobalt decorated rim from a Rhenish stoneware jug, and one piece of 19th century domestic stoneware with brown interior slip. Also recovered from level 4 was one pipestem (6/64), oyster and mammal bone fragments, and pieces of coal. The uniform texture and appearance of this level as well as the mixture of materials it contained suggest that this may have been an early to mid 19th century fill, possibly related to the excavation and construction of new commercial buildings.

Level 5 was a heterogeneous, sandy, dark brown organic fill which extended to approximately eleven feet two inches below grade. A large pocket of apparently sterile blue marine clay intruded into

Profile C,
Looking East

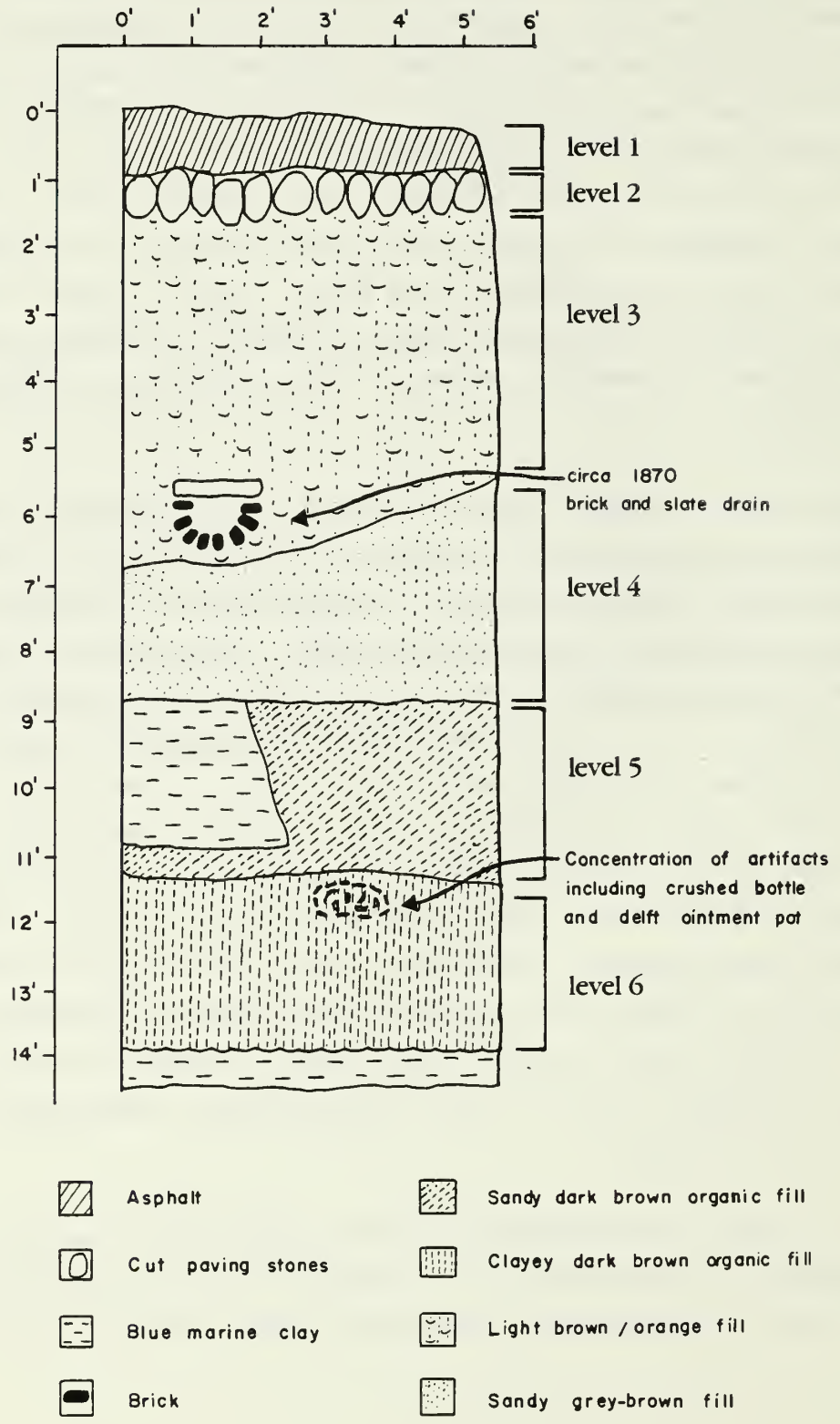


Figure 8

this level on the north side. Artifactual material occurred intermittently throughout the brown fill. Ceramics included a wide range of imported and domestic early to mid 18th century wares. Of the 19 specimens recovered, 10 (53%) were typable according to South's dating formula. The other nine were glazed but undecorated redwares.

Ceramic Type	Type Median Date	Sherd Count	Product
Buckley Ware(47)	1746	1	1746
Buff earthenware(56)	1733	1	1733
Brown salt glazed stoneware mug(53)	1733	1	1733
Slip dipped stoneware(48)	1745	1	1745
White salt glazed stoneware(40)	1763	2	3526
Underglaze blue porcelain(39) [tea cup base, probably Yung Cheng]	1730	2	3460
Decorated delft(49)	1750	2	3500
		10	17443

This results in a sample date of 1744. While some doubt must be expressed in regard to the reliability of this date, the second quarter 18th century does seem a reasonable estimate.

A small sample of only six pipes came from Level 5. These broke down as follows: 2(4/64), 3(5/64) and 1 (6/64), providing a sample date of 1747. Only one of the pipes bore any marking - a fragmentary stem and bowl with a plain, slightly convex heel and a deeply impressed mark, two overlapping W's, on the back of the bowl (see Figure 5b). In both shape and style this pipe is unlike typical Bristol or London examples and may have been from Exeter, another important pipemaking city and port on England's south coast. The exportation of Exeter pipes to the New England colonies, and to Boston in particular, has been documented and appears to have peaked between 1670 and 1720 (Arnold and Allan 1980:305-315). The overlapping W mark could be that of William White, one of the city's major producers at the turn of the 17th century (Ibid. 1980:308).

Other examples of the WW mark are known from the Schurtz site, also a bowl mark (Omwake 1958:3), and from the ca. 1700-1720 Onondaga Iroquois Sevier site, a heel mark (Bradley 1979:413).

Also present in level 5 were several pieces of dark green, globular bodied wine bottles (mostly bases) and fragments of a small, blown pharmaceutical bottle of medium green glass with a small basal kick. Other materials present included a bone backed wooden button, a few faunal (Capra) and shellfish (Mya arenaria) remains and numerous fragments of wood, mostly branches. The shellfish remains appear to reflect human waste disposal rather than the presence of a resident species.

Level 6 was also a heterogeneous dark brown organic fill, but much more clayish than the sandier level 5. This level, which extended to a depth of fourteen feet below grade, appears to be the same deposit as seen in level 4 of Profile B. Artifacts tended to occur in concentrated pockets rather than in random distribution throughout the fill.

One such concentration contained nearly all the artifacts recovered from this level. Of the fourteen ceramic pieces included, only seven (50%) were typable. The other seven were redwares. Two of these, however, appeared to be from the same vessel - a straight sided pan with swags of trailed slip decorating the interior (see Fairbanks and Trent 1982 II:230, Figure 199 for a similar example).

Ceramic Type	Type Median Date	Sherd Count	Product
British brown stoneware(54)	1733	1	1733
Westerwald(44)	1738	2	3476
Westerwald(58)	1668	1	1668
Iberian storage jar(38)	1710*	1	1710
Plain white delft(65)	1720*	1	1720
Plain delft ointment pot (see Fairbanks and Trent 1982 II:#358c)	1700*	1	1700
		7	12007

*revised date estimate

This results in a sample date of 1715. Other materials from this concentration included two pipestems (both 5/64), one crushed wine bottle, as well as pieces of others (all with a broad base, squat shape), the square base and several fragments of a rectangular "case" bottle, brick and mortar pieces, ballast flint, and a wide range of organic materials. In addition to shoe pieces, leather scraps and a small section of coarse linen (?) cloth, a large quantity of faunal remains were present. Most frequently represented was cow (Bos taurus) with sheep (Ovis aries), pig (Sus scrofa) and unidentified bird present as well (see Appendix B). Many of these bones showed butchering or cut marks.

Outside this concentration of artifacts, few materials were recovered from level 6. Besides small fragments of brick, bone and bottle glass, only two other articles were found, both at the base of the level just above the blue clay. One was a broken wine glass with a single large knop just below the bowl and an elongated air bubble within the stem. Nearby was a section of small yellow or "Dutch" brick. Similar brick found during the excavation of Profile K (see below) correspond in size and shape with examples recovered from the site of Ft. Orange, Albany, New York (Sopko 1982).

One final feature of level 6 was the presence of molluscan remains - both gastropods (Nassarius triuittatus) and bivalves (Mytilus edulis). Both appear to have been resident species. As in level 4, Profile B, the presence of these species indicates both a muddy harbor bottom and the presence of a hard, intertidal substrate (see Appendix C).

In summary, Profile C represents another view of the filled waterfront seen in Profile B. Two undisturbed fill episodes were noted. The earliest appears to date from the end of the 17th or early decades of the 18th century and to have been produced by gradual accretion. This was overlain by a second fill which appears to date from the mid 18th century. An undetermined amount of the upper portion of this level was destroyed by 19th century construction and utility work.

Profile D

Profile D, located near the southern edge of the site, was exposed as heavy equipment excavated for the basement of the hotel (see Map 3). Fortunately, an area approximately twelve feet square between piers #35 and #36 was left intact for a day, allowing this profile to be recorded and soil samples collected. Shortly after, this remnant was also removed, although a portion of it was redeposited nearby. While this destroyed the stratigraphic record, artifactual materials were still recoverable and could be traced back to the recorded profile with some confidence.

Profile D was one of the most interesting profiles recorded at the Bostonian Hotel site. It contained seven levels (see Figure 9). Level 1, located approximately six feet felow grade, was a concrete basement floor. Level 2 was a sterile sand footing on which the concrete slab had been cast. Both these levels were 20th century improvements to a then-standing 19th century commercial building.

Level 3 was a compact gray fill composed primarily of crushed slate and extending to just over seven feet below grade. Undoubtedly the original 19th century basement floor, this level also contained a wooden plank drain approximately five inches in diameter and oriented roughly east-west. Very few artifacts were present in this level; only two were recovered. One was a fragment of bone (possibly Bos). The other was a piece of "yellow ware," a highly fired earthenware similar to ironstone. As yellow ware was first developed during the late 1820s and did not become widely available until after 1835, its presence in level 3 provides a terminus post quem for construction of the slate floor. One other artifact, recovered from the profile area after it was disturbed, probably originated from level 3 as well. This was a small rim section of hand painted pearlware. Level 3 may well have been the original basement floor of Oak Hall, a stylish Gothic Revival commercial building built in 1840 which housed a business specializing in ready-made clothing.

Profile D,
Looking South

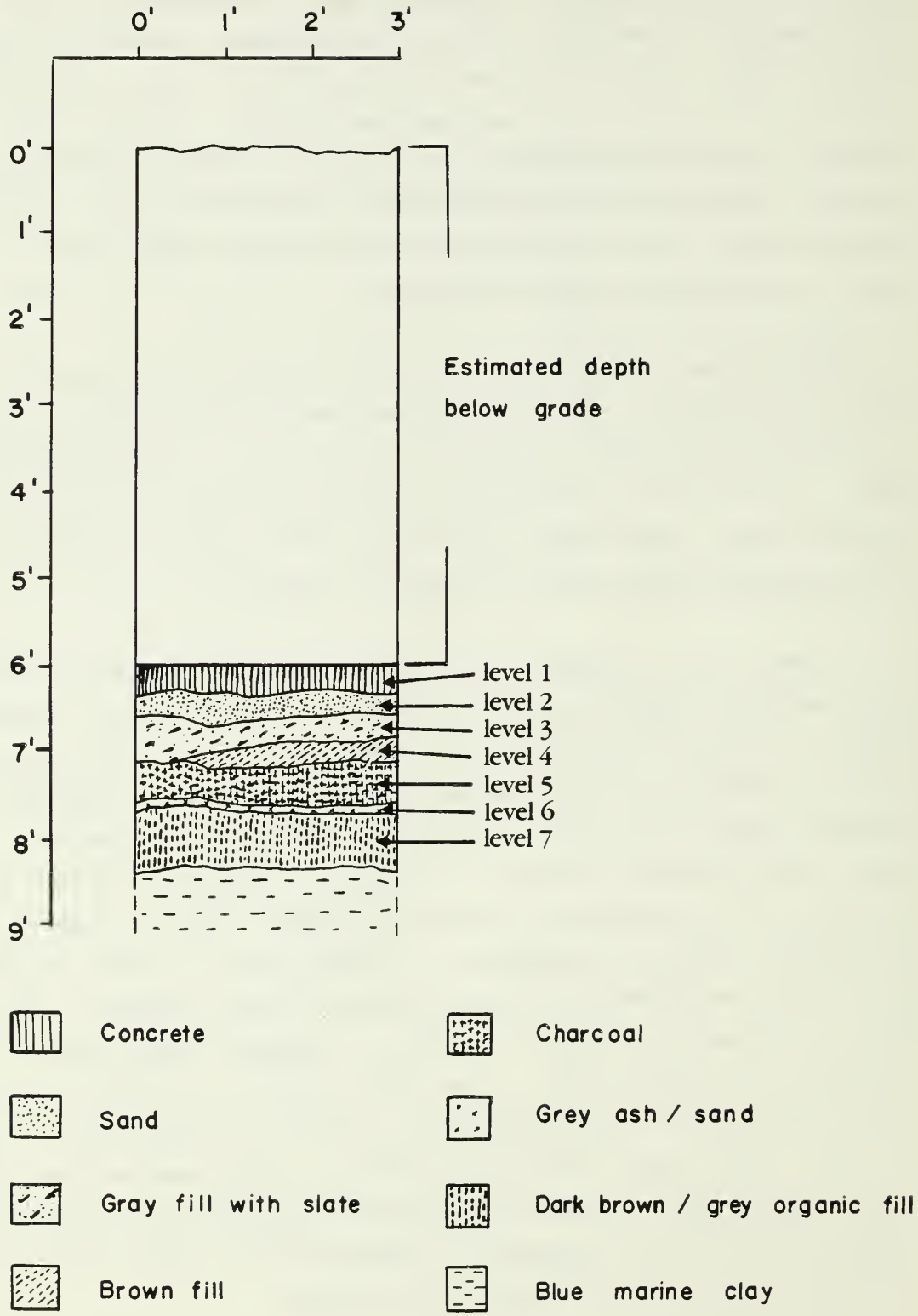


Figure 9

Level 4 was a remnant of a fill deposit probably dating from the 18th century. Most of this level appeared to have been removed when the slate floor of level 3 was put in place. This brown fill contained a few brick fragments and no other artifacts. Chemical analysis suggests a significant amount of natural soil material and low concentrations of culturally-enriched elements.

Level 5 was a very wet organic level, averaging five inches in thickness and composed primarily of charcoal, although brick fragments, rocks and other organic materials were also present. Upon examination, the samples of charcoal were all from cut planks rather than logs or branches. One piece retained diagonal saw marks and was from a plank one inch thick. Although no chronologically diagnostic artifacts were recovered from level 5, documentary evidence suggests that this level was composed of debris from a fire in 1679 which destroyed several buildings in the area (see Chapter Two). Soil chemical results indicated high values for lead, iron and aluminum. The sample was surprisingly low in potassium, which is usually associated with wood ash.

Level 6 was a thin (one inch) but complex layer of ash with pockets of calcined bone and grey sand. This level was highly compacted and contained no diagnostic materials. In terms of its chemistry, it appeared to be quite similar to the ash lens (soil sample #4) from level 4, Profile B. An unusually high lead value probably was due to leaching from level 5.

Level 7 was a heterogeneous, loosely organized fill directly on top of the blue marine clay. Although rather irregular, this dark brown to grey fill averaged seven inches in thickness and contained several large rocks and branches, many of which projected down into the underlying clay. Cultural material, though not common, was present. Among the materials recovered were several pieces of brick with mortar adhering to them, a section of humerus (Bos taurus) and three ceramic fragments. One, a rim section from a tin glazed earthenware plate (figure 10a), has been identified as a Portuguese majolica

(Merry A. Outlaw: personal communication). This ware appears to have been commonly used in New England during the mid 17th century (Fairbanks and Trent 1982 II:277-78). A plate with nearly identical decoration has been recovered by the Virginia Research Center for Archaeology from a ca. 1690 trash pit at the Joseph Petitt site (see Figure 11). A second rim section from level 7 was also a cobalt decorated tin glazed earthenware. While too small to allow for positive identification, this piece is similar to plate fragments recovered from several sites in Virginia dating to the second quarter of the 17th century and tentatively identified as of Spanish origin (Merry A. Outlaw: personal communication). The last ceramic piece from level 7 was a small undecorated fragment of white delft.

Analysis of soil from level 7 indicated high readings for manganese, magnesium and calcium, which may reflect the presence of marine peat in the fill. The absence of phosphorus suggests that no human waste was present. With the exception of lead, which may have leached from level 5, metal values were low.

A sample from level 7 was also analyzed for pollen. As in level 4, Profile B, the results indicate a mixed deciduous/coniferous forest but of somewhat different composition. For arboreal pollen, the dominant types were oak (15%), buckthorn (15%), hickory (5%), pine (4%), birch (3%) and poplar (2%). The presence of buckthorn (Rhamnus) is of particular interest since it is not an indigenous species (Harlow 1957:252). Its prevalence around an active commercial waterfront may represent an initial settlement by a new immigrant species. Non-arboreal pollen counts indicate a fairly high percentage of low-spine compositae (19%) and a somewhat lower value for grasses (11%). This suggests a greater degree of soil disturbance than was evident from other levels on the site and would be consistent with documentary evidence for filling in order to "raise" the land after 1650 (see Chapter Two). One final note on pollen: Old World cereal grasses were again present.

Portuguese Majolica Fragments,
from Profile D

a. from level 7
b. from disturbed context

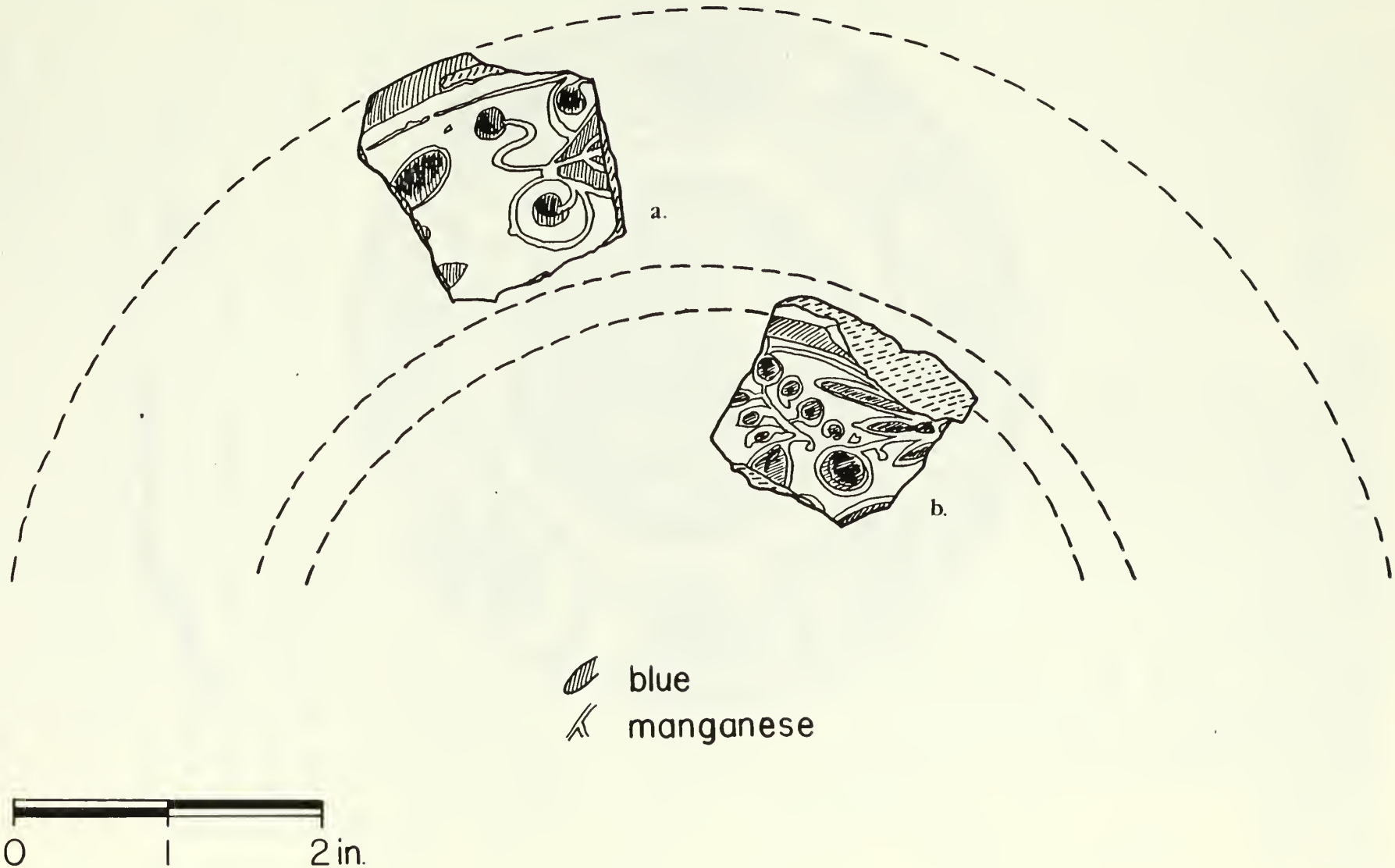


Figure 10

Portuguese Majolica Plate,
Joseph Petitt site, the Governor's Land, Virginia

(Courtesy of Virginia Historic Landmarks Commission, Research Center for Archaeology)

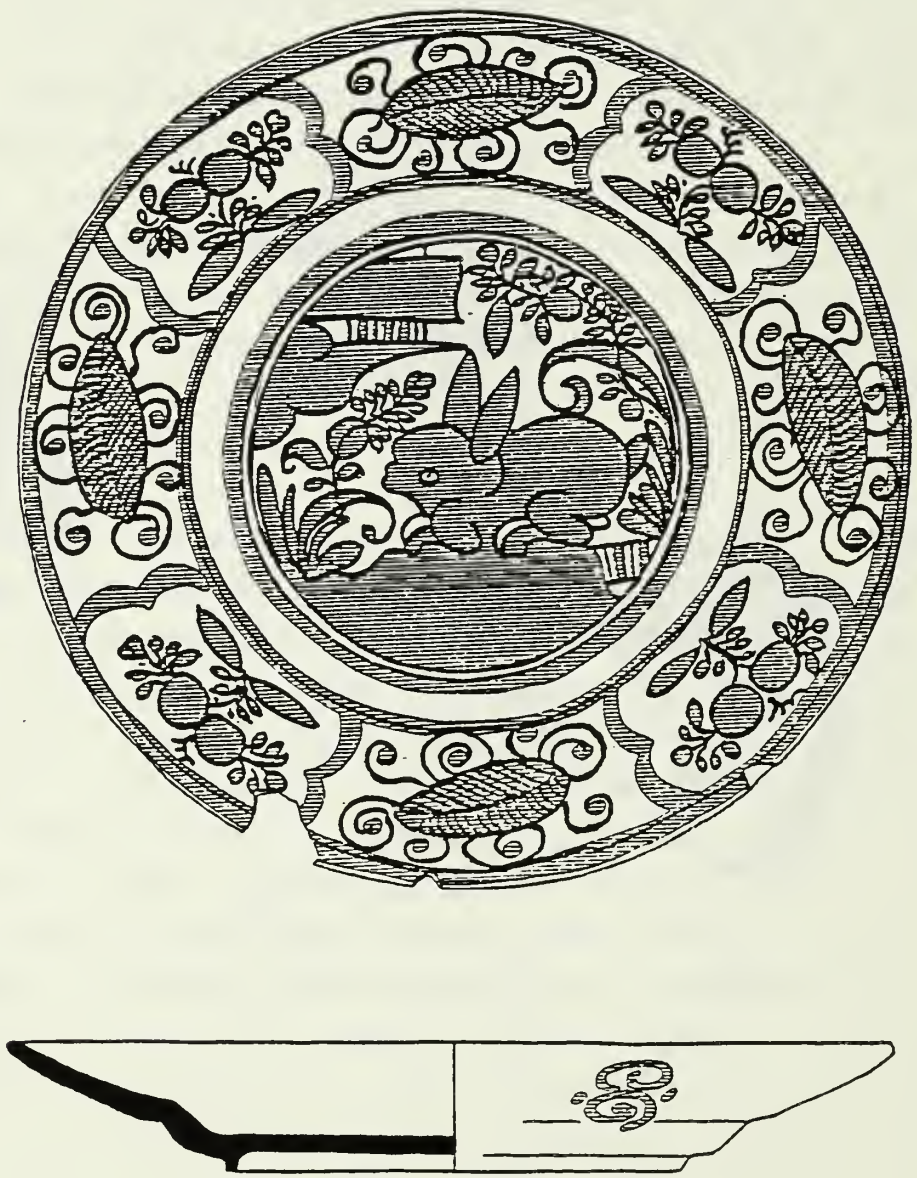


Figure 11

After machine disturbance of the Profile D area, several additional artifacts were recovered. Nearly all were associated with the same viscous dark brown to grey fill which characterized level 7. Among them were nine ceramic fragments. These included a second piece of Portuguese majolica, five pieces of undecorated white delft, two pieces of redware and the handpainted pearlware rim section mentioned above in relation to level 3. The second majolica fragment was from a similar, even identical plate, as was represented by the example from level 7. Both pieces were decorated with cobalt and manganese motifs imitating those of Ming porcelain (see Figure 10). The largest of the plain white delft fragments was from a conical vessel base. With a maximum diameter of 4 3/4" and straight rather than flared sides, this piece could have been the base of a salt, candlestick, or other vessel. Three of the other delft fragments were small body pieces; all had a plain white tin glaze on both sides. One piece had a hint of decoration - dots (?) of manganese along one side. The last piece of delft was a small, slightly everted lip fragment which also was undecorated. The two pieces of redware were undecorated aside from lead glazing. One appeared to be from a pan-shaped vessel.

Other materials from this disturbed context included two pieces of bottle glass and one of window (?) glass, all badly decomposed, and five pipestems. These had stem bore diameters as follows: 3(7/64), 1(8/64), and 1(9/64) which produce a sample date of 1641. None of the pipestems bore any markings.

Several leather and wooden objects, all well preserved by the clay fill, were also recovered. Among these was a nearly complete shoe, missing only the left quarter (see Figures 12 and 13). Analysis by Dean Nelson of the Delaware State Museum has pointed out several interesting traits. A tie rather than buckle fastened shoe, this piece was designed for light wear. It was probably heelless as there was no evidence of pegging or other heel attachment. One heel lift was present between the inner and outer soles. The shoe was sized, a numeral 8 stamped on the inner sole. Finally, the cut of the

Shoe Pieces,
from Profile D, disturbed context

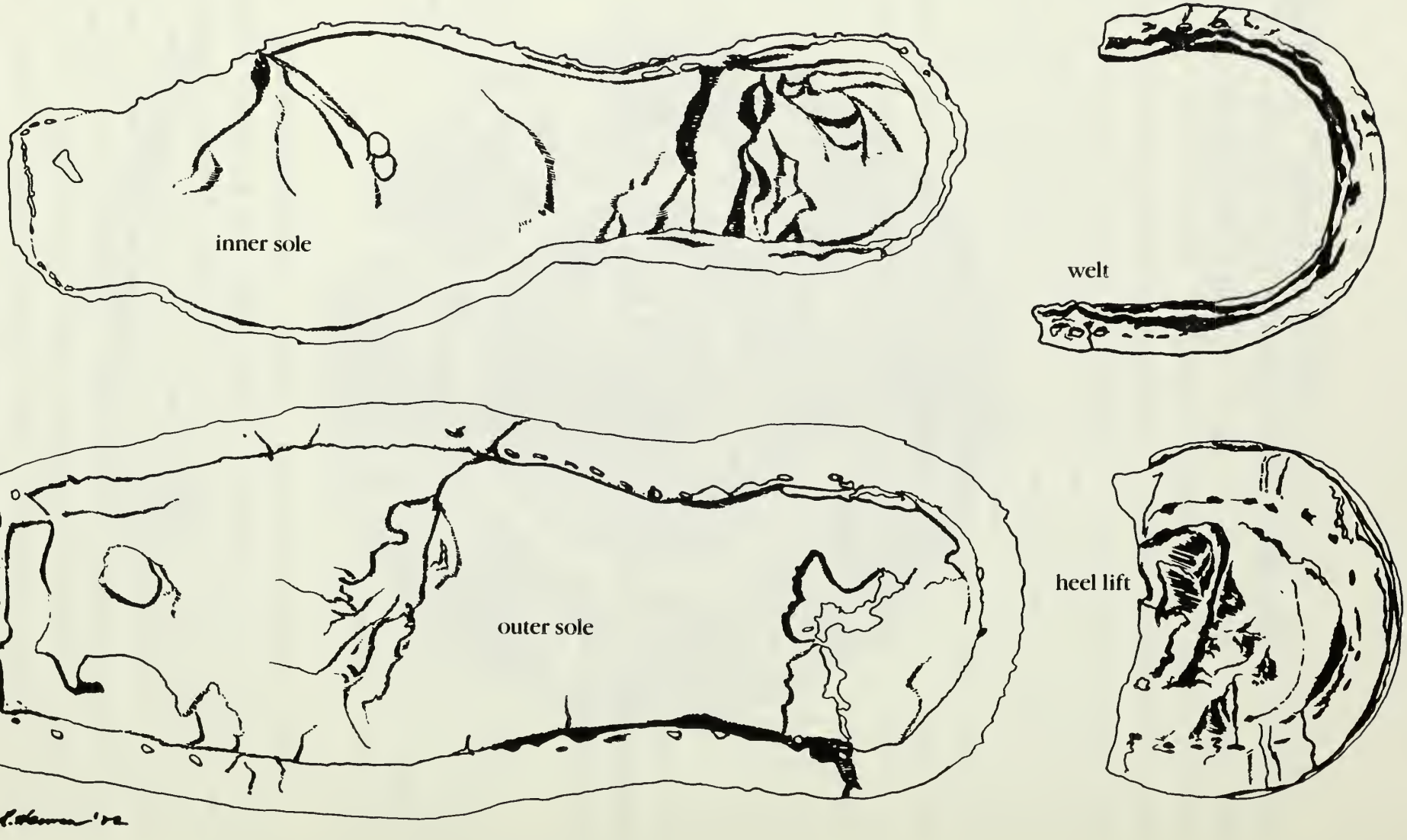
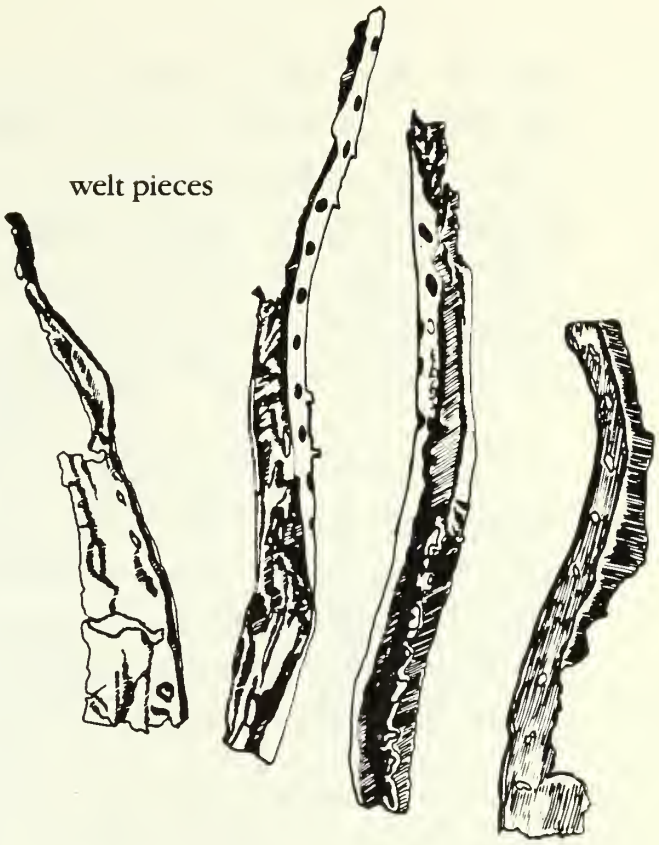


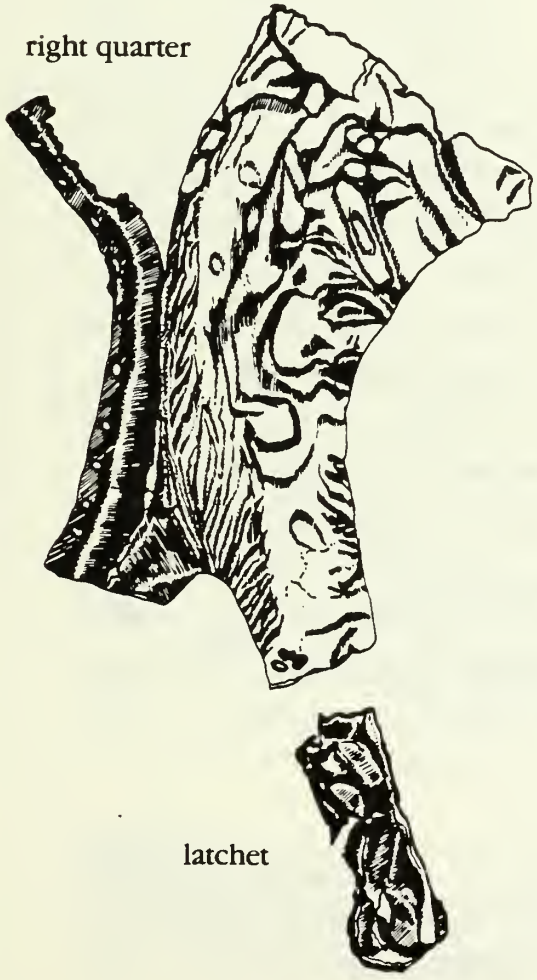
Figure 12

Shoe Pieces,
from Profile D, disturbed context

inner lining or stiffener



welt pieces



right quarter

latchet

vamp

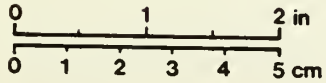


Figure 13

quarter and vamp were such as to allow an open space below the latchets. This kind of open work was common in mid 17th century shoes and similar examples occur in several Dutch genre paintings. Examples include Pieter Codde's "The Smoker" ca. 1635 (Wright 1978:76) and Jan Victor's "A Village Scene with a Cobbler" ca. 1650 (Jacobs 1976:155). In addition to this shoe, other shoe pieces and scrap leather were also recovered.

Found with the shoe was a wooden awl handle, virtually identical in form to styles used during the 18th, 19th and even 20th centuries (see Figure 14a). Finely turned from a burled wood of unknown species, this handle has an iron reinforced shaft into which the awl itself would be set. A second wooden article recovered from the same area was a finely carved spoon or ladle (probably white pine).

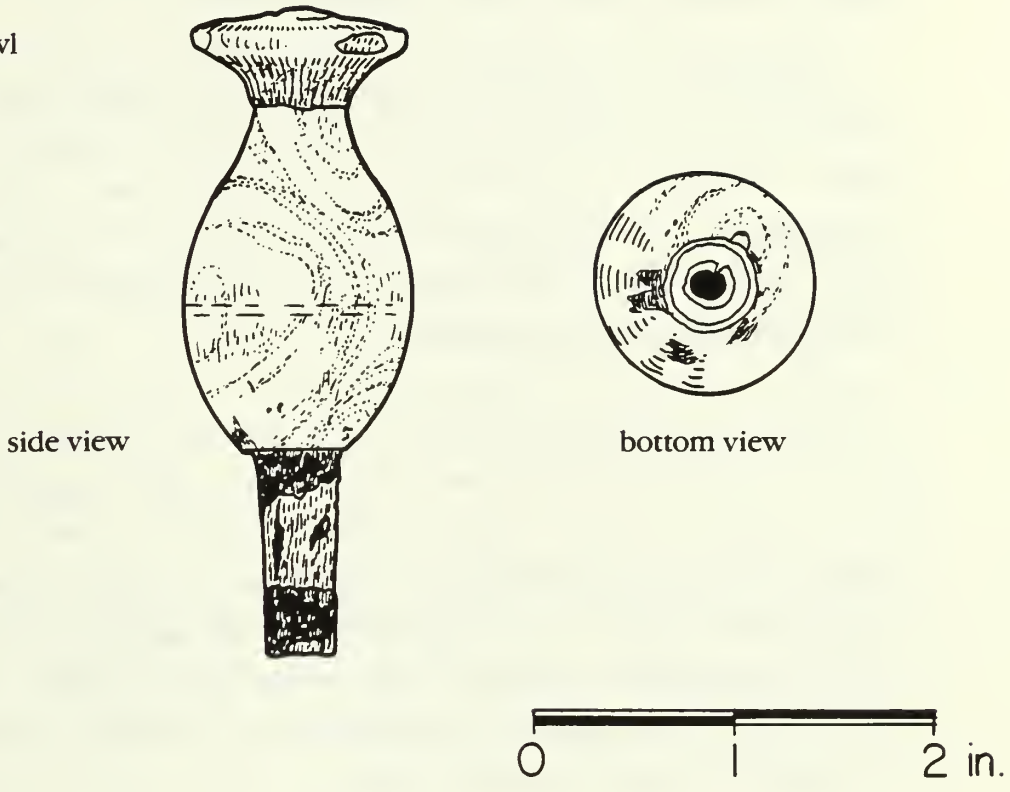
The other wooden objects found were building related. These included small carved pegs and sections of framing members. One timber was complete - a gable or rafter cross brace, five feet in length with a mortise and tenon joint on one end and a lapped joint on the other (see Cummings 1979:79 for a schematic framing diagram which employs similar timbers). A detailed building contract for a similar cross-gabled house, built on the corner of North and Blackstone Streets in 1679, suggests that the timbers found in the Profile D area could easily have come from mid to third quarter 17th century houses in the area (Watkins 1921:29-31). Other building materials also noted from the Profile D area were several large red/orange bricks as well as chucks of plaster and possibly roughcast.

Faunal remains, though not abundant, were also present. Most common was cow (Bos taurus), although sheep (Ovis aries), pig (Sus scrofa) and several varieties of shellfish were recovered as well. Several small pieces of ballast flint were also collected.

In summary, Profile D represents two mid to third quarter 17th century fill levels overlain by ca. 1680 fire debris which apparently had been used for fill as well. Above these were 19th and 20th century basements.

Wooden Objects,
from Profile D, disturbed context

a. shoemaker's (?) awl



b. wooden spoon

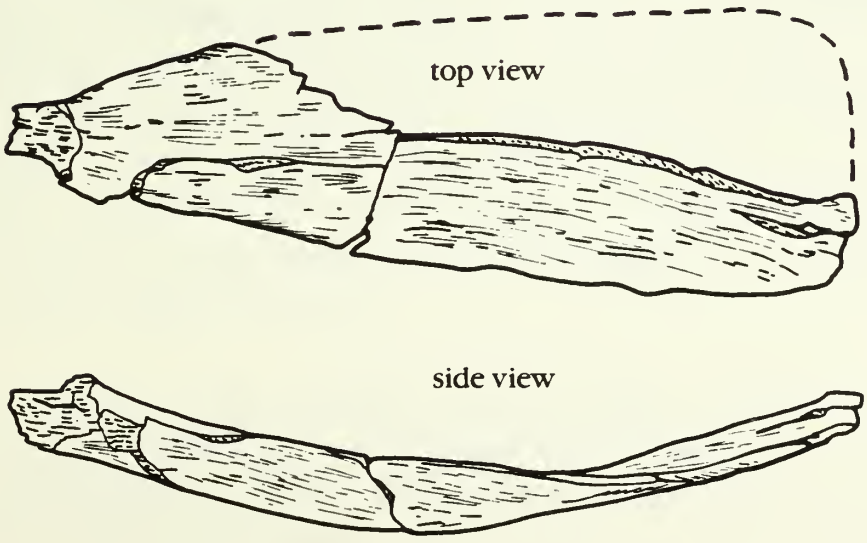


Figure 14

Profile E

Profile E was situated along the North Street wall of the excavation near the southern limit of the site (see Map 3). Due to time constraints and difficulties of access, only superficial observations and measurements were made of this profile.

Profile E is important in that it documents the presence of an undisturbed peat layer at the southern edge of the site. This peat deposit appears to represent a submerged salt marsh which was inundated by the post-Pleistocene rise in sea level (Kaye and Barghoorn 1964:63,70). This peat layer was encountered in only five of the thirteen profiles on the site.

The first seven feet of Profile E were composed of a series of brick or concrete floors and foundations, plus associated clean fills, which appear to date from the late 19th and early 20th century. Below this, the peat layer extended from 7 feet 2 inches to 9 feet 8 inches below grade. It was quite uniform in thickness and disturbed only in one place, on the eastern edge of the profile, where a utility line intruded to a depth of approximately 8 feet 6 inches. The peat was underlain by blue marine clay.

No artifacts were observed in Profile E and no soil or peat samples were collected.

Profile F

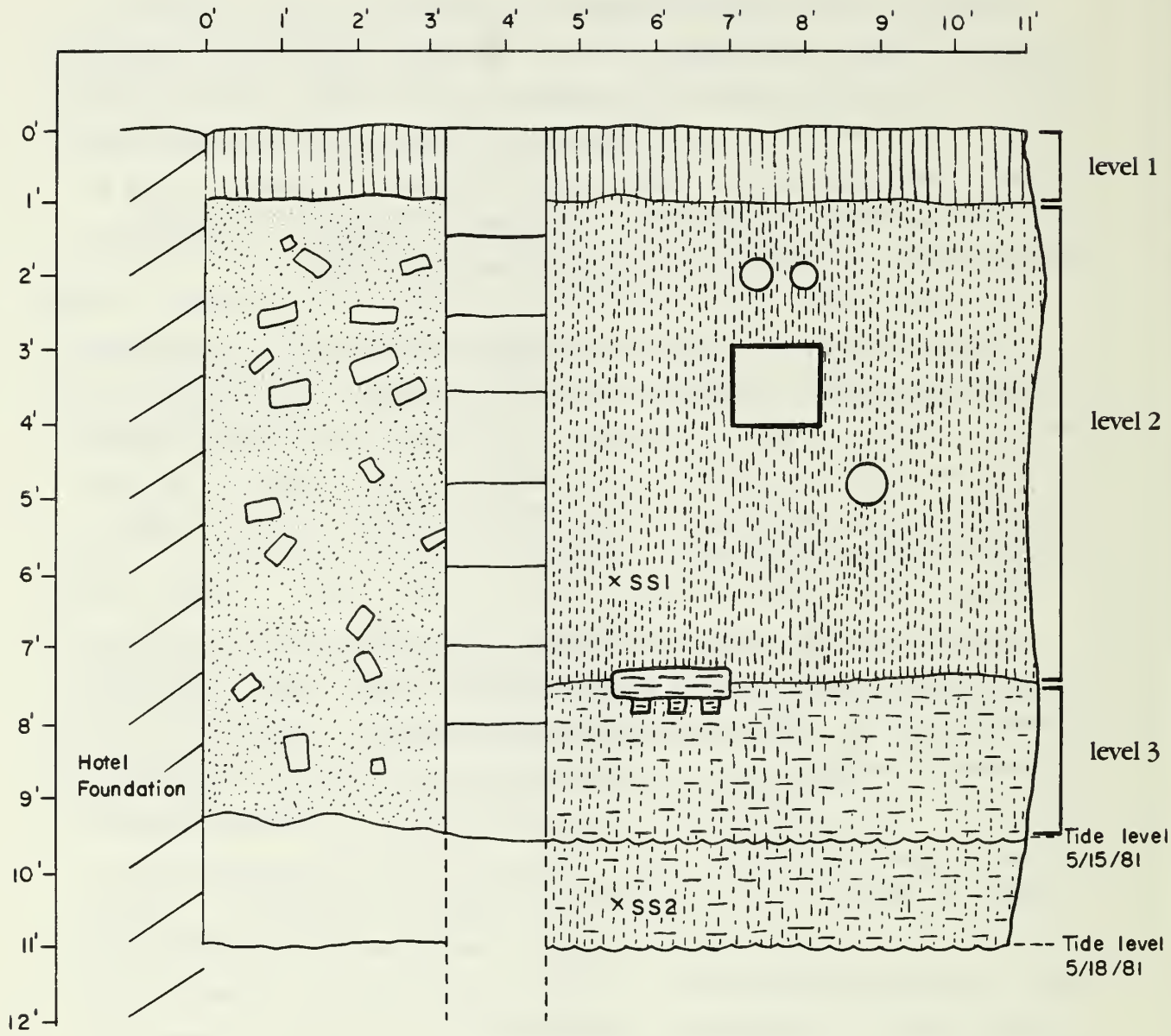
Profile F was exposed during excavation of a new water and sewer line along Creek Square on the northern edge of the site (see Map 3). Despite extensive disturbance in the upper levels of the profile, the lower fill levels, apparently dating from the late 18th century, remained intact. Once again, problems of access as well as water in the trench limited the recovery of samples. Nonetheless, two controlled soil samples were taken from the profile.

Three levels were present in Profile F as well as several building-related features (see Figure 15). The features, including a 19th century granite block foundation and construction debris/backfill around the hotel's foundation, were not recorded in detail. Nor was there much to record about level 1 - a concrete pavement which extended one foot below grade.

Level 2 was a dark brown sandy fill which extended from one foot to seven feet five inches below grade. This was a variable, highly mixed fill with fairly high organic content. Numerous utility lines and what appeared to be a wooden box sewer were located in this level. Also present was a remnant of wooden cribbing possibly related to previous utility work. Aside from one soil sample taken at a depth of six feet, no materials were collected from level 2. Analysis of this soil sample (SS1) revealed no artifacts, but several interesting chemical characteristics. The sample had an extremely high concentration of phosphorus, suggesting the presence of human or other organic waste. Given the presence of a sewer line in this level, this result is not surprising. This soil sample also had high value for copper and lead as did the other late 19th and early 20th century fills on the site.

Level 3 was a medium brown organic fill with a fairly high clay content. Artifacts were common in this level, occurring primarily in concentrated pockets. In several places, dense lenses of compacted wood chips and shavings were noted. The level extended from seven

Profile F,
Looking West



Concrete

Dark brown sandy fill with construction debris

Blue-grey clay and brown organic fill

Granite block wall

Dark brown organic sandy fill

Sewer pipes

Wooden sewer

Wooden cribbing

SS1-SS2 — location of soil samples collected

Figure 15

feet five inches to at least eleven feet below grade. The monitoring of additional backhoe excavations in the trench suggested that this level extended at least another three feet deeper.

One controlled soil sample was removed from level 3 at a depth of ten and a half feet. Artifactual material from this sample included: three pieces plain creamware, two pieces black glazed redware (one the base of a small bowl), four pieces window glass, two glass bottle necks, oyster shell and faunal remains (Bos). This soil sample (SS2) had chemical characteristics very different than soil sample #1, indicating little or no leaching within the profile. This sample was high in zinc, iron, manganese and lead. While the marine clay present within level 3 may have been the source of the iron and manganese, the zinc and lead appear to be a reflection of human activities, possibly tanning.

In addition to the artifacts recovered from soil sample 2, other materials were collected from the lowest exposed portion of level 3. These artifacts were pooled with those recovered during monitored backhoe excavations and given a "Profile F, level 3-backdirt" designation. Materials collected from the backdirt of unmonitored excavations were given a "Profile F, general backdirt" provenience.

A wide range of domestic and imported ceramics were present in these two samples. The level 3-backdirt sample produced a total sherd count of 63, of which 43 (68%) were typable; the other 20 pieces were redwares. The general backdirt sample had a total sherd count of 77, of which 61 (79)% were typable. The remaining 16 pieces were redware. According to South's dating formula, these samples break down as follows:

		Level 3 Backdirt		General Backdirt	
Ceramic Type	Median Date	Count	Product	Count	Product
Buff earthenware(56)	1733	0	0	2	3466
Jackfield(29)	1760	0	0	1	1760
Whieldon(36)	1755	2	3510	2	3510
Creamware, plain(22)	1791	13	23283	26	46566
Creamware, painted(18)	1788	2	3576	2	3576
Creamware, marbelized(no #)	1775*	2	3550	2	3550
Pearlware, plain(20)	1805	0	0	3	5415
Pearlware, painted(17)	1800	1	1800	2	3600
Decorated delft(49)	1750	5	8750	5	8750
Rouen faience(21)	1788	1	1788	0	0
Westerwald(44)	1738	1	1738	1	1738
English brown stoneware(54)	1733	1	1733	2	3466
Nottingham stoneware(46)	1755	2	3510	0	0
White English stoneware(40)	1763	2	3526	6	10578
Plain grey stoneware(no #)	1720*	4	6880	0	0
Porcelain, painted under-glaze(39)	1730	3	5190	5	8650
Procelain, brown exterior wash(no #)	1760*	1	1760	0	0
Porcelain, decorated overglaze(26)	1808	3	5424	2	3616
		43	76018	61	108241

These figures result in a sample of 1768 for the level 3-backdirt, and 1774 for the general backdirt.

Unlike the samples from several of the other profiles on the site, few smoking pipes were recovered from Profile F. Only one pipestem (5/64) was included in the level 3-backdirt sample, while five stems -

4(4/64) and 1(5/64) - were present in the general backdirt sample. None of these bore any markings.

Glass objects were fairly common; both bottles and drinking vessels were present. The level 3-backdirt sample contained several pieces of globular shaped bottles, including one unusually long necked example, and the bases of two clear glass undecorated tumblers. The general backdirt sample contained pieces of both globular and rectangular shaped bottles as well as a small pharmaceutical vial and a tumbler. Several pieces of what appeared to be window glass were also present in each sample.

One distinctive characteristic of the artifactual assemblage from Profile F was the large number of shoe parts and leather scrap. Thirteen identifiable shoe parts were included in the general backdirt sample. The majority of these were insoles or soles (9) although vamps (2) and quarters (2) were also present. Two additional insoles were recovered with the level 3-backdirt sample. Although these pieces seem to have come from a wide variety of men's and women's shoes, most appear to be typical of third and fourth quarter 18th century styles.

Finally, faunal remains were common from Profile F. In addition to the small faunal sample from soil sample #2 described above, a much larger sample was recovered from the general backdirt. The most frequently represented mammalian species was sheep (Ovis aries) followed by pig (Sus scrofa), cow (Bos taurus), goat (Capra hircus) and domestic cat (Felis catus) (see Appendix B). The size and type of bones represented suggest that much of this was butchering rather than table-related refuse. Also present were several unidentified large avian bones, possibly goose or turkey, several fish bones and oyster shells.

In summary, Profile F represents a late 18th century fill episode, the upper portions of which have been heavily disturbed by later construction and utility-related activities.

Profile G

Profile G, like Profile F, was exposed during excavations for new water and sewer lines along Creek Square. This profile was at the eastern end of Creek Square where it joins Blackstone Street (see Map 3).

Most notable in this profile was the profound extent of 19th and 20th century disturbance. These included granite block building foundations (probably early 19th century) and a variety of utility and sewer lines. Two lines were noted in particular. One was a wooden box sewer located 7 feet below grade (possibly the same one which had been noted in Profile F); the other was a log pipe nine inches in diameter located approximately two feet south of the box sewer. No samples were collected from the light brown backfill associated with these features and which extended to a maximum depth of 8 feet 4 inches.

Beneath these sewer/utility related disturbances, although truncated on the north by a brick manhole and on the south by the granite block foundations, was an undisturbed remnant of an earlier fill level. This level was a dense dark grey fill with a high organic and artifactual content. Only 14 inches of this level were exposed and, as with Profile F, level 3, it clearly extended deeper than 9 feet 6 inches, the maximum depth of the excavation.

Artifactually, the materials from the undisturbed portion of Profile G were quite similar to those recovered from Profile F. As with Profile F, two samples were taken - one controlled sample from the undisturbed fill level, the other collected from excavation backdirt.

Ceramics were well represented in these samples. A total of 27 sherds, of which 14 (52%) were typable, were recovered from the undisturbed fill level. The remaining 13 pieces were redware. The backdirt sample had a total sherd count of 38, of which 21 (55%) were

typable; the rest were redware. According to South's dating formula, these samples break down as follows:

Ceramic Type	Median Date	Undisturbed Level Count	Undisturbed Level Product	Backdirt Count	Backdirt Product
Buff Earthenware(56)	1750	1	1750	1	1750
Buckley ware(47)	1746	0	0	1	1746
Creamware, plain(22)	1791	9	16119	7	12537
Pearlware, painted(17)	1800	0	0	1	1800
Decorated delft(49)	1750	0	0	3	5250
English brown stoneware(54)	1733	1	1733	0	0
White English stoneware(40)	1763	2	3526	5	8815
Porcelain, painted underglaze(39)	1730	0	0	1	1730
Porcelain, decorated overglaze(7)	1808	1	1808	2	3616
		14	24936	21	37244

These figures result in a sample date of 1781 for the undisturbed fill, and 1774 for the backdirt.

As with Profile F, smoking pipes were not prevalent in the samples from Profile G. Only three stem pieces were recovered from the undisturbed fill: 2(4/64) and 1(5/64). Six pipestems were present in the backdirt sample: 3(4/64), 2(5/64) and 1(6/64). None of these pipes were marked.

Glass artifacts were also sparsely represented in the Profile G samples. Only two bottle fragments were recovered from the undisturbed fill - one from a square-based bottle, the other from a globular shaped bottle. Only one fragment from a globular bottle was present in the backdirt sample.

Other artifactual characteristics of the 18th century fill level were noted in the field, although examples were not included in the samples collected. Bricks appeared frequently, often in loose association with sections of plaster/roughcast. As with Profile F, shoe parts and leather scrap also seemed to be quite common. Only a few pieces of scrap were included in the samples collected.

Finally, faunal remains were, once again, plentiful. These included molluscan remains, especially hard shell clam and oyster, mammalian remains (unidentified) and avian (probably duck and goose/turkey). Many of the bones, especially the avian ones, were burned as well as broken.

In summary, Profile G represented the upper portion of a late 18th century fill deposit which had been nearly obliterated by 19th and 20th century construction and maintenance activities.

Profile H

Profile H was located along the Scott Alley wall of the excavation on the western side of the site (see Map 3). Accurate recording was not possible, a result of both difficulty of access and the rather rough condition in which the excavation equipment left the profile. Despite these problems, Profile H is important because, like Profile E, it documents the location of the post-Pleistocene peat layer.

The first seven feet of Profile H appeared to contain three levels. These included two paving episodes (asphalt over cut granite blocks) in the first foot and a half to two feet below grade. Below these, to a depth of approximately six to eight feet, was a mixed level of dark brown heterogeneous fill. Although no discrete cultural levels could be discerned within this fill, materials reflecting a late 17th to mid 19th century date range were observed. This level was truncated on the southern end by utility and drainage disturbances, and on the northern end by 19th century granite block foundations.

Beneath the dark brown fill, a level of compacted peat occurred between seven and eight feet below grade. While conditions made it difficult to record this layer precisely, the peat appeared to be about a foot thick.

In general, this peat layer seemed quite uniform. As it extended north across the profile, however, the layer began to drop off at an approximate tilt of 20°. As a result, the peat layer commenced at about nine feet below grade on the northern edge of the profile, and extended to a depth of ten feet.

One other possible anomaly was noted. In two places, there appeared to be a thin (one foot or less) layer of blue marine clay overlying or interlensed with the peat. It is not clear whether these represent natural deposition or cultural activities such as filling or dredging. Unfortunately, more detailed observations were not made. Beneath the peat level was undisturbed blue marine clay.

Profile I

Profile I was located on the northern side of Creek Square and was recorded from the south wall of a backhoe trench. This trench, and the one from which Profile J was recorded, were exploratory tests in preparation for the placing of a large holding tank beneath Creek Square (see Map 3).

Five levels were noted. The first was a thin asphalt paving. Beneath this was an older paving of rounded cobbles set in a sandy orange-brown fill. The base of this fill was one foot below grade. Level 3 extended from one to two and a half feet below grade and was composed of a mixed brown fill which contained a considerable amount of coal ash. A few mid 19th century ceramic fragments were noted from this level but not collected.

Beneath these 19th and 20th century levels was a sequence of clay-peat-clay levels. As with Profile H, it is unclear whether these reflected the natural undisturbed stratigraphy or whether cultural factors were involved. Level 4 was a band of blue marine clay which extended from 2 feet 6 inches to 3 feet 6 inches below grade. Beneath this was a fairly thick peat layer, level 5, which extended from 3 feet 6 inches to 6 feet 6 inches below ground surface. This peat in turn was underlain by blue marine clay which extended to the base of the trench (9 feet 2 inches).

Profile J

Profile J was located on the northeastern side of Creek Square (see Map 3). As noted above, it was recorded during the test trenching which preceded excavations for the holding tank.

Four levels were recorded. Level 1 was, once again, a thin asphalt pavement. Beneath the asphalt was a rounded cobble paving very similar to that observed in Profile I. Here, however, the cobbles appeared to cap a fairly thick layer of coarse brown fill which contained brick and other building related debris. Both the cobble paving and underlying fill were designated level 2. This level extended to a depth 4 feet below grade. Beneath this brown fill was level 3, a layer of peat. Unlike Profile I, there was no evidence of blue marine clay above the peat. Level 3 was approximately two feet thick extending from four feet to six feet below the surface. Below the peat was a layer of organic, dark grey to brown clay. Designated level 4, this clay appeared to be naturally deposited and extended from six to about seven and a half feet below grade. Underlying this grey-brown clay was blue marine clay to a depth of at least eight and a half feet.

Profile K

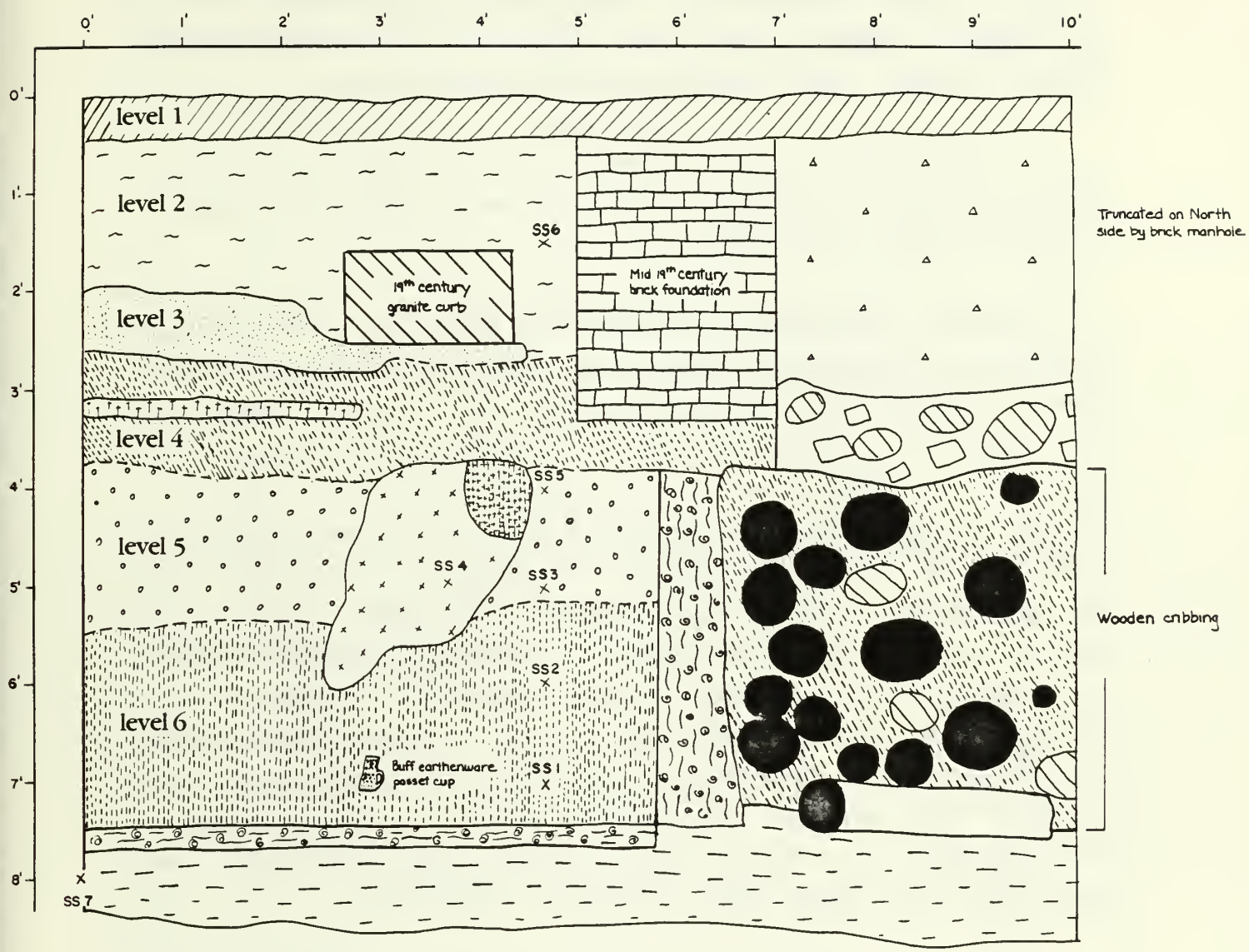
In November 1981, most of the eastern side of Creek Square was excavated to make way for a large concrete holding tank. Profile K was located along the west wall of the holding tank excavation, approximately in the center of Creek Square (see Map 3.)

This profile contained a complex stratigraphic record and was the only profile recorded on the site which included structural features as well as fill deposits (see Figure 16). Because of time constraints, a decision was made to focus on recording and sampling the stratigraphic sequence on the southern side of the profile.

Six levels were recorded. The first three all represented mid 19th to early 20th century activities. Level 1 was a recent asphalt pavement. Beneath this was a grey to brown, sandy fill which extended from four inches to approximately two feet below grade. No cultural materials were evident in this level; however, soil sample #6 (SS6) taken at a depth of one foot six inches did contain several artifacts. These were a mixture of late 17th and mid 18th century ceramics which appeared to have been redeposited along with 19th century materials (similar to level 4, Profile C). While the date of this fill level is unclear, it may be related to the construction of a brick commercial structure which stood in this part of Creek Square from ca. 1860 to 1920. The brick foundation recorded in the center of the profile was probably part of this structure which housed both carpenter and iron working shops.

Beneath level 2 was a layer of yellow to tan brown sand. Extending from two feet to two feet ten inches below grade, this sand was probably the matrix into which blocks of cut granite curbing were set. A remnant of this mid 19th century curb was noted, but no other cultural materials were observed. Neither level 2 nor 3 continued on the north side of the brick foundation. In their place was a coarse orange-brown fill, much of which appeared burnt. This level extended to approximately three feet below grade.

Profile K,
Holding Tank, west wall



Asphalt
Gray brown sandy fill
Yellow brown / tan sandy gravelly fill
Brown fill
Olive brown cloyey sandy fill
Rock and brick fill
Ploster
Wooden logs
Wooden timbers (cut)
Grey osh
Blue marine clay
Approximate fill junction
Charcoal / burnt brown fill
Dark brown organic fill
Burnt fill

SS1-SS6 — location of soil samples collected

Figure 16

Level 4 was a mixed brown fill which extended from approximately two feet eight inches to three feet ten inches below grade. This level contained a thin lens of plaster and extended beneath the brick foundation in the center of this profile. No artifactual material was observed from this level, but based on its stratigraphic position this fill probably dates from the early 19th century.

As with levels 2 and 3, level 4 did not continue north of the brick foundation. Instead, a layer of heavy rubble fill, primarily rocks and brick, was present.

Level 5 was a sandy to clayish olive brown fill located between three feet ten inches and five feet six inches below ground surface. Two soil samples were collected from this level, one (soil sample #5) at a depth of four feet, the other (soil sample #3) at a depth of five feet. A few artifacts were present in both these soil samples, although in general this level was very clean and contained little cultural material. Soil sample #5 had three small pieces of redware, one pipestem (5/64), a square nail, brick and window glass fragments and bits of calcined bone. Soil sample #3 contained a small piece of blue on white delft, one pipestem (6/64), a piece of roughcast (?) and some calcined and fragmented bone. These artifacts suggest an 18th century date. Soil chemical tests were also done on this sample and revealed moderately high concentrations of manganese and phosphorus (see Appendix A). The latter may represent the presence of human waste and other highly organic substances in the fill.

Level 5 was also distinguished by the presence of an irregularly shaped pit feature. This feature cut through the olive brown fill and was composed primarily of ash, although considerable charcoal and calcined bone were present as well. A soil sample (#4) from this feature was processed for pollen, but none was present. A disturbance in the upper portion of this feature may be related to level 4 since the brown fills in each were quite similar.

Level 6 was a dark brown organic fill which extended from five feet four inches to approximately eight feet below grade. This appeared to be the same deposit as was observed in level 3 Profile A, level 4 Profile B and level 6 Profile C. As in these other deposits, artifactual material was frequently encountered and often occurred in concentrated pockets. Three soil samples were taken from this level and are described in greater detail below.

The ceramics from level 6 included a range of imported and local wares of the late 17th and early 18th century. Of the twenty-two specimens recovered, fifteen (68%) were typable according to South's dating formula. The other seven were glazed redwares. These were undecorated with the exception of one "Metropolitan ware"-like chamber pot rim.

Ceramic Type	Type Median Date	Sherd Count	Product
Buff earthenware(56)	1733	4	6932
Buff earthenware posset pot(56)	1695*	1	1695
Delft chamber pot(76)	1710*	1	1710
Plain white delft(65)	1720	1	1720
Decorated delft(49)	1730*	1	1730
Mottled ware tankard(36)	1710*	1	1710
British brown stoneware(54)	1733	1	1733
Hohr stoneware(59)	1700	1	1700
Westerwald chamber pot(77)	1738	1	1738
Westerwald(44)	1738	2	3476
Westerwald(58)	1668	1	1668
		15	25812

*revised date estimate

This results in a sample date of 1721. As has been noted elsewhere, several of the type median dates used in South's dating formula are inaccurate or imprecise. More appropriate median dates have been

Buff Earthenware Posset Pot,
from Profile K, level 6

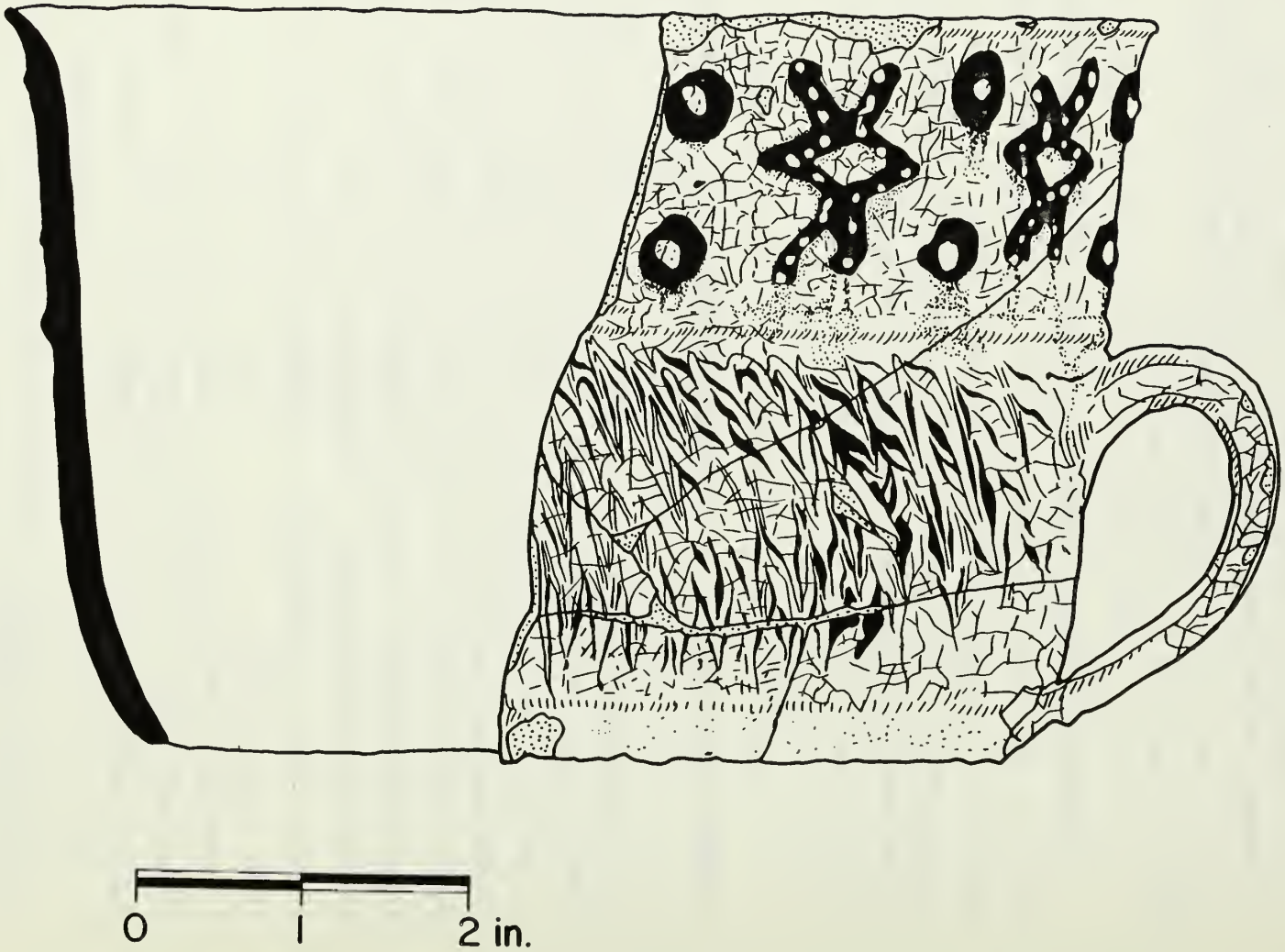


Figure 17

used in four instances. Mottled ware tankards (36) are discussed under Profile A. The large, originally two-handled, buff earthenware posset pot (Figure 17) is very similar to dated examples from the last decade of the 17th century. Lewis (1969:25 figure 34) illustrates a specimen dated 1698. This partially reconstructed pot was recovered during the excavation of the holding tank area at a depth of seven feet below grade (see Figure 16). The flat lipped plain white chamber pot is a style which Noel-Hume dates between 1680 - 1735 (Noel-Hume 1969:147 Figure 56 right).

Several smoking pipe fragments were also recovered from level 6. The thirteen stems had the following breakdown in bore diameter: 1(4/64), 9(5/64) and 3(6/64). These produce a sample date of 1734.7. Only one of these pipes was marked, a molded TH in a circle on the right side of the bowl of a heelless (4/64) pipe.

Other materials from level 6 included two pieces of bottle glass, several brick pieces and fragments, mortar and ballast flint. Considerable organic material was also present in level 6. Leather scrap, shoe pieces, and both faunal and floral remains were recovered. Faunal remains included food related refuse, primarily fish, fragmentary mammalian (Ovis and Sus) and avian bones, as well as shellfish. While the oyster shells probably represent food refuse, the other species, both bivalves and gastropods, were likely active inhabitants of the tidal zone (see Appendix C). Level 6 also contained a considerable amount of plant remains, especially wood shavings and chips. Bark and branches from white pine, oak, white birch and poplar were recognizable. Analysis of the pollen from soil sample #1 indicates a similar breakdown. Chemical analysis of this soil sample indicated a composition characterized by moderate to low levels of potassium, calcium and magnesium and most metallic trace elements. A moderately high manganese level may be due to the incorporation of peat or marine clay into the fill.

In addition to the artifacts collected directly from Profile K, several materials were recovered from backdirt contexts during and after the excavation. While these materials have been assigned only a "Profile K, backdirt" provenience, it is likely that nearly all came from level 6.

This backdirt sample contained a varied and interesting assortment of ceramics. Of the total sherd count of 143, 92 (64%) were typable according to South's system. The remaining 51 pieces were redwares and probably produced locally. Among these redwares, 18 were non-decorated and interior glazed only, 21 were non-decorated but glazed on both the interior and exterior, and the remaining 12 slip decorated. According to South's system, the ceramics broke down as follows:

Ceramic Type	Type Median Date	Sherd Count	Product
Buff earthenware(56)	1733	21	36393
Mottled ware(36)	1710*	1	1710
"Tudor Green" ware(no#)	1650*	1	1650
Metropolitan Ware(60)	1645	1	1645
Plain white delft(65)	1720	6	10320
Decorated delft(49)	1730*	16	27680
Delft apothecary jar(71)	1698	1	1698
Westerwald (58) manganese and cobalt decoration	1668	10	16680
Westerwald (44) cobalt decoration only	1738	13	22594
Westerwald chamber pot(77)	1738	5	8690
Plain gray stoneware(no#)	1720	6	10320
Nottingham stoneware(46)	1720*	2	3440
British brown stoneware(54)	1733	2	3466
Bellarmine(66)	1660	1	1660
Slip dipped stoneware(48)	1745	4	6980
Porcelain(39) painted underglaze	1730	1	1730
Porcelain(no#) brown exterior wash	1760	1	1760
		92	158416

*revised date estimate

This results in a sample date of 1722. Additional comments help to clarify two of the ceramics in this backdirt sample. The two pieces of Nottingham brown stoneware are from a large cylindrical tankard with a cordoned neck and sprig mold embellishments. A very similar mug was recovered during excavations at Richmond Palace, Surrey (Dixon 1975: 113, Figure 5, #17). The bellarmine piece from the Profile K area was from a large jug with a stylized, third quarter 17th century face. A virtually identical vessel with City of Amsterdam coat of arms was recovered about 1870 on the site of the Brattle

Square Church (now City Hall) Boston. This vessel was found in what was apparently a truncated well dating ca. 1700 and is now in the Isabella Stewart Gardner Museum (Beebe 1981: 26-28).

In addition to ceramics, a good sample of clay smoking pipes was recovered from backdirt contexts. Seventy stems had measurement bore diameters which break down as follows: 2(4/64), 40(5/64), 20(6/64), 6(7/64) and 2(8/64). These produce a sample date of 1720.9. Five marked bowls or heels were included in this sample: IT - molded on either side of a plain flat heel (4/64), LE - impressed on the back of a heelless bowl (5/64), TK - molded on either side of a plain, flat heel (5/64), P/ within a circle - molded on the right side of a heelless bowl (5/64), and IS(?) - molded on either side of a plain, flat heel (6/64).

Considerable bottle glass was also collected from the backdirt. All appear to have come from short necked, globular or squat shaped bottles typical of the early decades of the 18th century. Other materials recovered include leather scrap and shoe pieces, ballast flint, several yellow bricks and large quantities of faunal remains. The yellow bricks, though mostly broken, fit well into the size range and description of the "small yellow bricks" from Ft. Orange (Sopko 1982: 14-15 and histogram I). Faunal remains were primarily cow (Bos taurus), although sheep (Ovis aries) was also well represented and some pig (Sus scrofa), deer (Odocoileus virginianus) and unidentified avian species (see Appendix B).

The most distinctive feature of Profile K was a log and rock structure located in the northern half of the profile at the same stratigraphic level as levels 5 and 6 (see Figure 16). This structure, which had been sectioned during excavation, appeared to be part of a cribbed wharf. It was composed of axe trimmed and debarked but otherwise unfinished logs of varying size, primarily white pine, which had been stacked crosswise with large rocks interspersed throughout. Unfortunately, detailed measurements could not be taken; therefore, the internal configuration of this structure shown in Figure 16 should

be considered schematic rather than actual. A second feature of this structure was the presence of a sawn vertical timber, approximately 6" x 8", which apparently had been driven into the underlying blue clay to hold the horizontal crosswork in place. An additional sawn timber was located along the base of level 6 at the junction with the underlying clay, but it was unclear whether this was directly related to the cribbing or not.

Documentary research suggests strongly that this wharf was built by Joshua Scottow, who purchased property in the Creek Square area in 1651 and greatly expanded its commercial waterfront over the next two decades. Since there is little information available on other 17th and early 18th century wharves, comparisons are difficult to make. Two recent projects, however, have indicated somewhat similar structures. Excavations at the Follett site, Portsmouth, New Hampshire in 1981 uncovered evidence of what was probably a late 17th or early 18th century wharf. In evaluating this wharf, Faith Harrington notes that the structure was:

> probably built by piling large unfinished wooden timbers on top of one another until the desired height was attained and the sides were then secured with vertical pilings.
>
> (Harrington, n.d.: 22)

This description fits the wharf structure exposed in Profile K. A similar construction process may have been used for parts of the Town Dock in Charlestown, Massachusetts as well (Steve Pendery: personal communication).

Other wharf features have been recorded in Creek Square besides the Profile K example. During preliminary site testing in December 1979, a backhoe testpit at the eastern edge of Creek Square revealed evidence of cribbed wharf construction. The engineering report noted that in test pit No. 8, remnants of a "wood grating system [with] 8 to 12" members laying horizontally in a criss-cross

fashion" were observed from six and twelve feet below ground elevation (13.7 feet above mean low tide). There was also some indication of vertical members present as well (Goldberg et al. 1980). Photographs included with the report indicate a crosswork of squared timbers, some of which had been fitted for mortise and tenon joints.

While it is unclear what relationship this wharf feature had to the one recorded in Profile K, the test pit No. 8 cribbing appears to be chronologically later. Recent archaeological investigation of Long Wharf in Boston (1711) revealed a similar style of squared timber cribbing but employing much more massive timbers (Bower, et al., n.d.).

In summary, Profile K represents a 17th century waterfront, including a wharf and a level of accumulated debris and sediment within the tidal zone, overlain by 18th and 19th century fills and structures.

Profile L

Profile L was located along the northwestern edge of Creek Square, roughly perpendicular to Profile J (see Map 3). It was recorded after excavation of the holding tank area.

Seven levels were recorded in this profile and a series of ten soil samples collected (see Figure 18). As with Profiles I and J, Profile L documented the presence of undisturbed peat layers in the Creek Square area. Due to better accessibility and working conditions, Profile L was recorded in a more careful and detailed manner than the other two profiles.

Level 1 was a thin asphalt pavement. As with Profile J, this was underlain by cobble pavement which capped a sandy but coarse brown fill. This fill extended to a maximum depth of three feet below grade. A remnant of wooden plank (shoring?) was noted at the base of this level. Soil taken from level 2 at a depth of one foot below grade (soil sample #1) was analyzed for soil chemicals. Moderate levels of most major nutrients were present, except for potassium. Moderate to high levels of several metals (iron, copper, zinc and lead) were present. Zinc and lead in particular had very high concentrations in this sample (see Appendix A).

Level 3 was a truncated layer or lens of blue marine clay which extended from two feet to two feet six inches. It was noted only in the center of the profile; other portions of this layer appear to have been altered or destroyed by level 2.

Level 4 was in a thin layer of dark brown organic fill which extended from two feet six inches to three feet below grade. Like level 3 above it, this layer also had been truncated by level 2. No cultural materials were noted in this level.

Level 5 was a layer of blue marine clay which extended from approximately three feet to between four and four and a half feet

Profile L,
Holding Tank, north wall

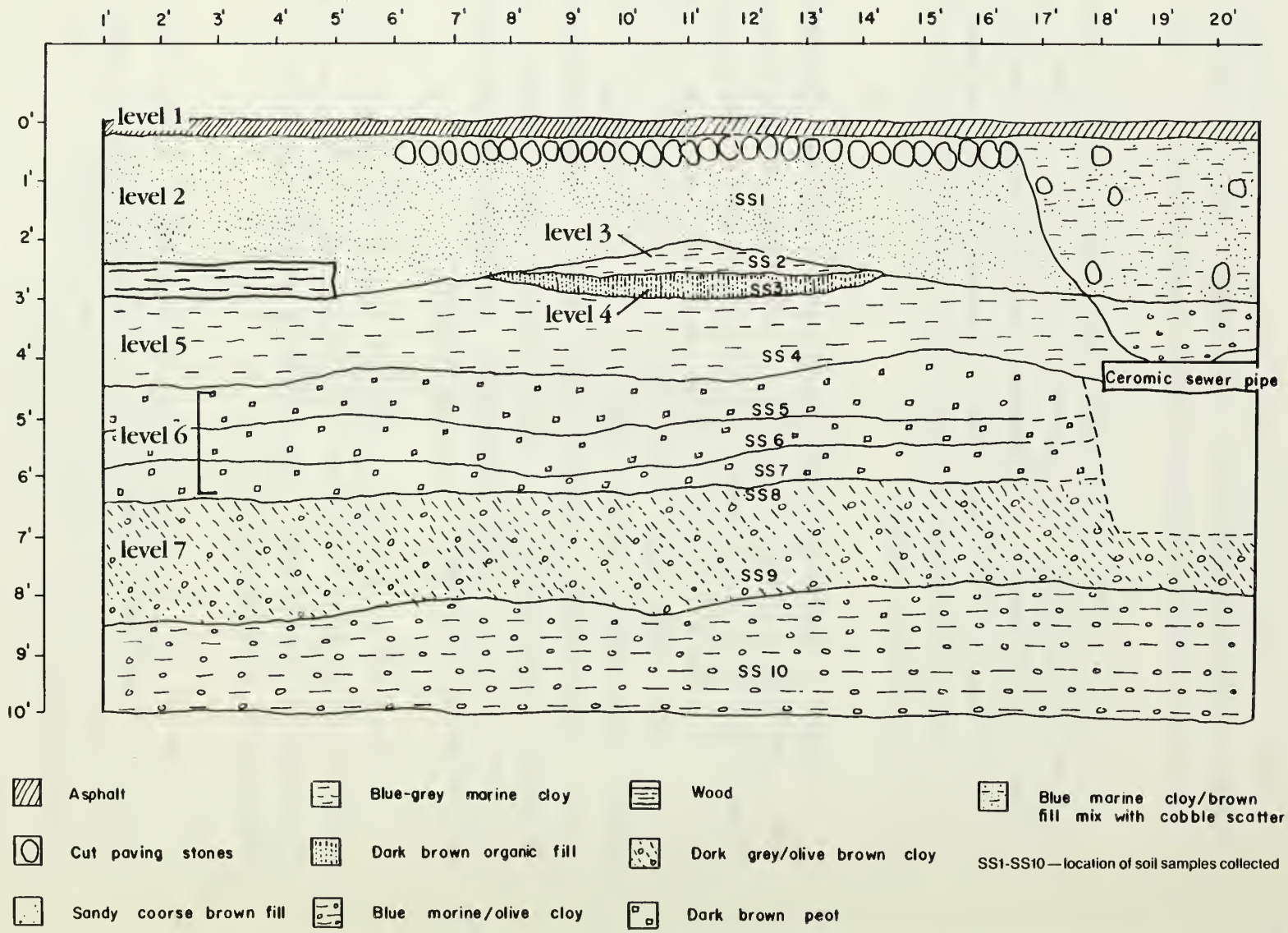


Figure 18

below ground surface. Like Profiles I and H, this blue clay rested on top of naturally occurring peat deposits. Unfortunately, it is not clear whether the clay itself is the result of natural deposition or if cultural processes (particularly dredging and filling) produced this level. Samples from level 5 (soil sample #4) were analyzed both for chemistry and pollen. Soil chemicals with high values included calcium, magnesium, potassium, iron and manganese. The pollen analysis indicated a predominance of white pine with mixed northern deciduous forest and freshwater marsh species.

Level 6 was composed of three layers of compressed dark brown peat. This level extended from approximately four feet to a maximum of six and a half feet below grade. Samples were collected from each of the three natural layers. Chemical analysis of the upper two layers (soil samples #5 and #6) indicate similar but not identical components. In both samples, potassium, calcium, magnesium, iron, manganese and aluminum were present in moderate to high quantities. Pollen analysis of these samples is planned.

Level 7 was a layer of dark grey to olive brown clay which lay beneath the peat. This layer was approximately two feet thick and extended to a maximum depth of eight and a half feet. Below this grey-brown clay, blue marine clay (mottled with olive clay) extended to a depth of at least ten feet below grade.

CHAPTER II

DOCUMENTARY HISTORY OF THE BOSTONIAN HOTEL SITE

One way to trace the history of a site is through records of property ownership and transfers. The original property holdings in Boston are recorded in what is called the Book of Possessions; land transfers after 1639 are in Suffolk Deeds. Several factors affect the reliability of the Book of Possessions. First, it was probably not compiled until 1643-44 (Clough 1927-30:6-10), thirteen years after Boston was first settled and after many of the original grants had been subdivided. The book also has some inconsistencies because of additional property transfers that took place while it was being compiled (Clough 1927-30:11-12). But the biggest drawback is that it did not originally include a map, so that in order to plot the location of properties one must try to piece them together on the basis of verbal descriptions. Several have attempted to do this: George Lamb compiled a series of maps to accompany the Book of Possessions when it was printed by the City of Boston in 1877 (Boston 1877), and Justin Winsor presented his version in the introduction to the second volume of his Memorial History of Boston (Winsor 1881,2:i-xlix).

The most thorough examinations of the Book of Possessions and Suffolk Deeds have been by two 20th century students of Boston history, Annie Haven Thwing and Samuel C. Clough. Thwing began her work as an inquiry about individuals in Boston's past but found it was necessary to locate the streets on which they lived. This led her to a systematic study of Boston's public records (Thwing 1916). She eventually published a book, The Crooked and Narrow Streets of the Town of Boston, 1630-1822 (Thwing 1920) which is a history of streets, but it is her voluminous papers at the Massachusetts Historical Society that are the most useful for a study of property holdings: "Suffolk Deeds, 1630-1800" traces the title transfers of every lot in Boston from the Book of Possessions through the Direct Tax of 1798, and a card catalog has information on every person mentioned in the

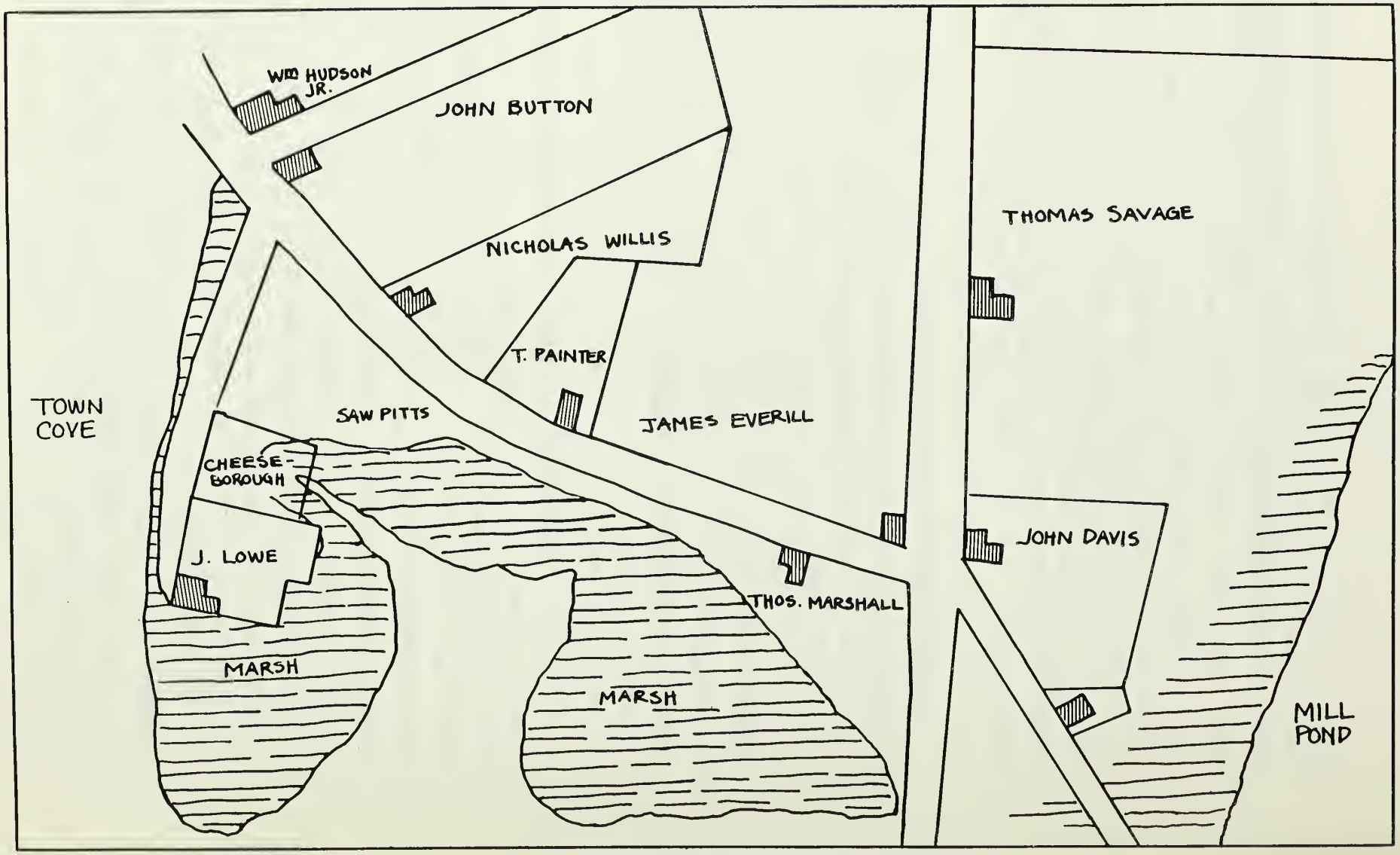
Deeds. Clough, a civil engineer who worked as a draftsman for the Boston Edison Company, studied Boston history and topography as a hobby. He wanted to map the holdings in the Book of Possessions, studied the same records Thwing had, and eventually produced a series of maps for different sections of Boston showing property holdings at various years and also large maps of all of Boston for 1638, 1643 (Book of Possessions), 1648, 1676, and 1798 (Clough 1919:251-53). His maps and extensive notes on the Suffolk Deeds, organized by lot location, are also at the Massachusetts Historical Society.

Another useful source of information about the Suffolk Deeds is the Records of Land Titles by Nathaniel Ingersoll Bowditch, also in the collection of the Massachusetts Historical Society. Bowditch was a 19th century conveyancer who did title searches for many properties in Boston. Although Thwing's work is a quicker guide to the Deeds, Bowditch's has some advantages: he generally cites more of a deed than Thwing (though sometimes omits information which indicates land use); he usually includes a plan of the area; and he traces titles into the 1800s.

The earliest settlement in Boston was concentrated near what became the Town Dock (now Dock Square). Although the Blackstone block is immediately adjacent to this area, it was not settled as early because most of the land was marsh. The marsh was originally granted to Richard Bellingham, a leading figure in the colony, but apparently some areas were suitable for building because as early as 1637 the town made grants to William Cheeseborough of "2 rod and a half square of the marsh next unto Mr. Bellingham's woodyard for to build upon" and to "John Lowe, wheelwright, 2 rod and a half square of the same marsh next unto our brother Cheeseborough for a house plot and yard room"(Boston 1877:20). Clough's reconstruction of the Blackstone block area in 1638 is shown in Map 4 (the northwest corner of the block was dry land and had been granted to Thomas Marshall before 1637).

Blackstone Block area,
ca. 1638

(after Clough manuscript map, courtesy Massachusetts Historical Society)



The Blackstone block area developed slowly in the 1640s; a few more lots were granted on land beyond the marsh in the southwest corner, near the intersection of present-day North and Union Streets. In 1643, however, the town made a grant that directly affected the future development of the area: in order to encourage the building of a grist mill, a group of proprietors were given all the Mill Cove and its surrounding marsh plus three hundred acres in Braintree provided that they erect one or more mills within three years. In addition, the proprietors were given the "liberty to dig one or more trenches . . . [if] they make and maintain sufficient . . . ways over same for horse and cart" and it was also stipulated that "if they carry their mill stream through the marish on the northeast of goodman Lowe's house, they have sixty foot [soon increased to ninety-three feet] in breadth throughout the said marish granted unto them . . ." (Boston 1877:74-75). The proprietors soon dammed the causeway across Mill Cove to create a mill pond and dug a mill stream, known as Mill Creek, across Bellingham's marsh connecting Mill Cove with the Town Dock area (see Map 5).

There is some disagreement about the early location of the mills. Most sources believe that two mills were built in the Mill Cove (Shurtleff 1890:112; Winsor 1881:1:533), but Clough, whose research is generally reliable, says that one of the first mills was in the Mill Creek itself (Map 6) and required a crosswork to power it. (Clough 1922-24:44). If this were the case, the inlet in Bellingham's marsh would have functioned as a mill pond. Unfortunately, Clough does not cite his source, but it is recorded that in 1649 the neighbors were given permission to remove "the crosswork that is set over the Mill Creek which hindreth the passage of boats" (Boston 1877:94). What is not clear from this reference is the exact location of the crosswork or even whether it was related to a mill. Apparently Clough himself questioned the location of the mill because another version of this map shows the mill at its customary site on the edge of Mill Cove (see Map 5). In this scheme, the crosswork would presumably have served to keep tidal water flowing back and forth to Mill Cove and the inlet in the marsh would not have been a mill pond.

Great Cove, and vicinity, 1640-1650

(after Clough 1922)

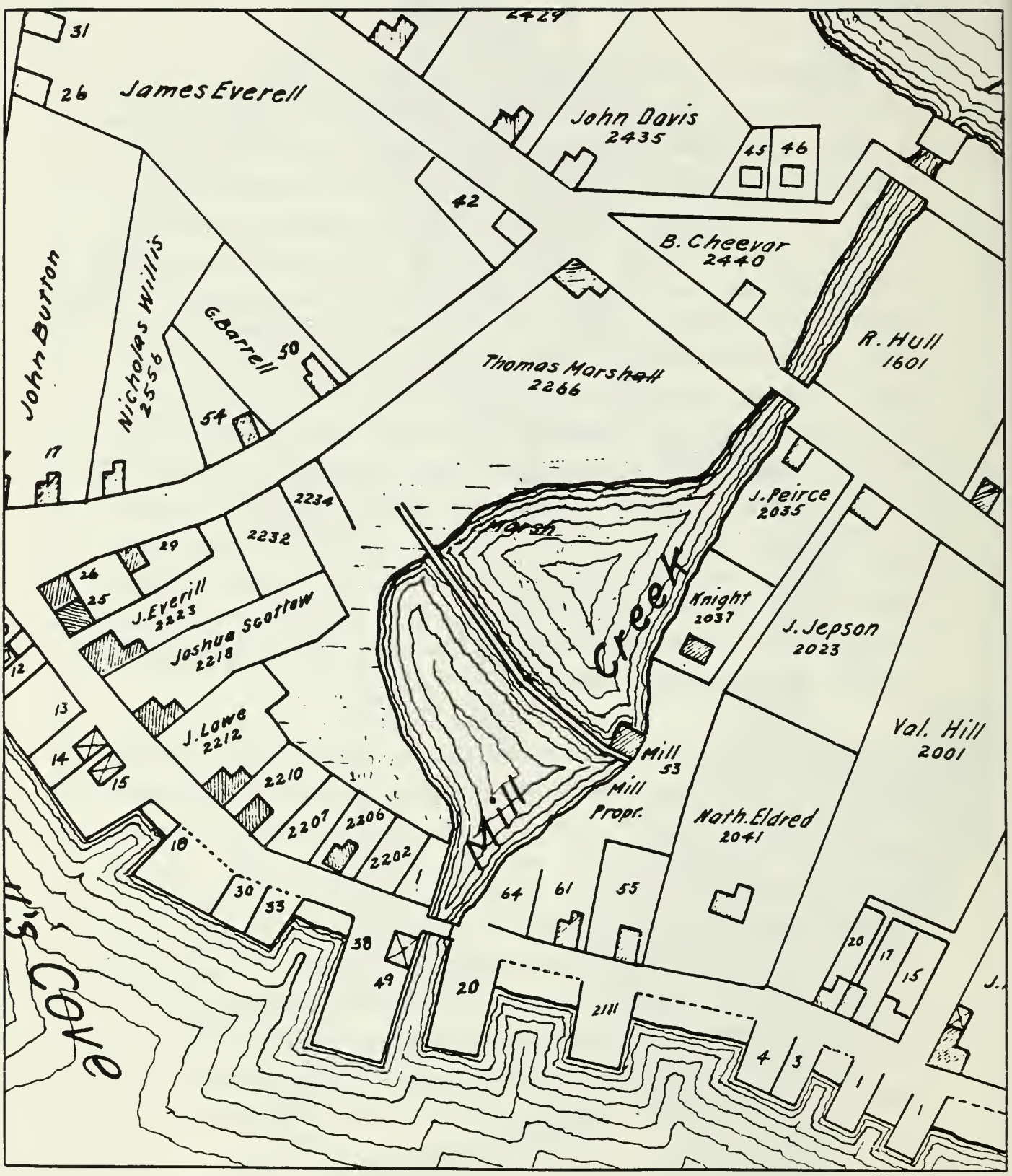
It should be remembered that Clough's maps are well-researched reconstructions, based on written descriptions, and that even if the inlet once functioned as a mill pond, it did so for only a very short time.

Regardless of whether the inlet was ever a mill pond, it is very clear from the records that it soon became a dock and wharf area. In 1648 the mill creek, inlet and some adjacent land were acquired by a William Franklin (Suffolk Deeds 1:105). In 1651, he sold half interest in the mill stream and the Conduit (North) Street drawbridge to Joshua Scottow. Scottow was a merchant whose holdings included land fronting on Conduit Street and abutting the inlet (Map 5). The deed between Franklin and Scottow stipulated that "further enlargement . . . of said stream . . . shall be for mutual benefit" to "all boats, shallops, pinnaces, barks, ships, sloops, and vessels whatsoever coming under or through said bridge or stream to either of their wharfs" (Suffolk Deeds 1:173). From these references, it is clear that Mill Creek had already been deepened enough to permit the passage of fairly large vessels and that Franklin and Scottow each had a wharf on the cove. Scottow's wharf was on land he had purchased from Franklin in 1650 (Suffolk Deeds 1:297). In 1653 he confirmed his interest in the area by purchasing the south half of the cove from Franklin (Suffolk Deeds 1:297).

Scottow and Franklin evidently did not have a very amicable relationship; their agreements were always laced with restrictions such as those in the 1653 deed: " . . . Scottow shall not narrow or straighten the said creek or cove by setting up spiles, timbers, wharves, or stakes . . . [or] hinder vessels going to Franklin's by putting vessels across or beyond the middle . . ." (Suffolk Deeds 1:297). And in 1655 one of their disputes was serious enough to be formally arbitrated. The judgment was in favor of Scottow because "digging any part of that land into creek or cove doth not take away his just right or inheritance" and against Franklin because "it is unrighteous for any man to sell a parcel of land and receive a just

Blackstone Block area, ca. 1643

(Clough manuscript map, courtesy Massachusetts Historical Society)



Map 6

recompence . . . and after improvement of the same land for that man to demand [an additional] price for it" (Suffolk Deeds 2:158). The decision is important here not because of the judgment but because it reveals that Scottow had deepened and widened the cove.

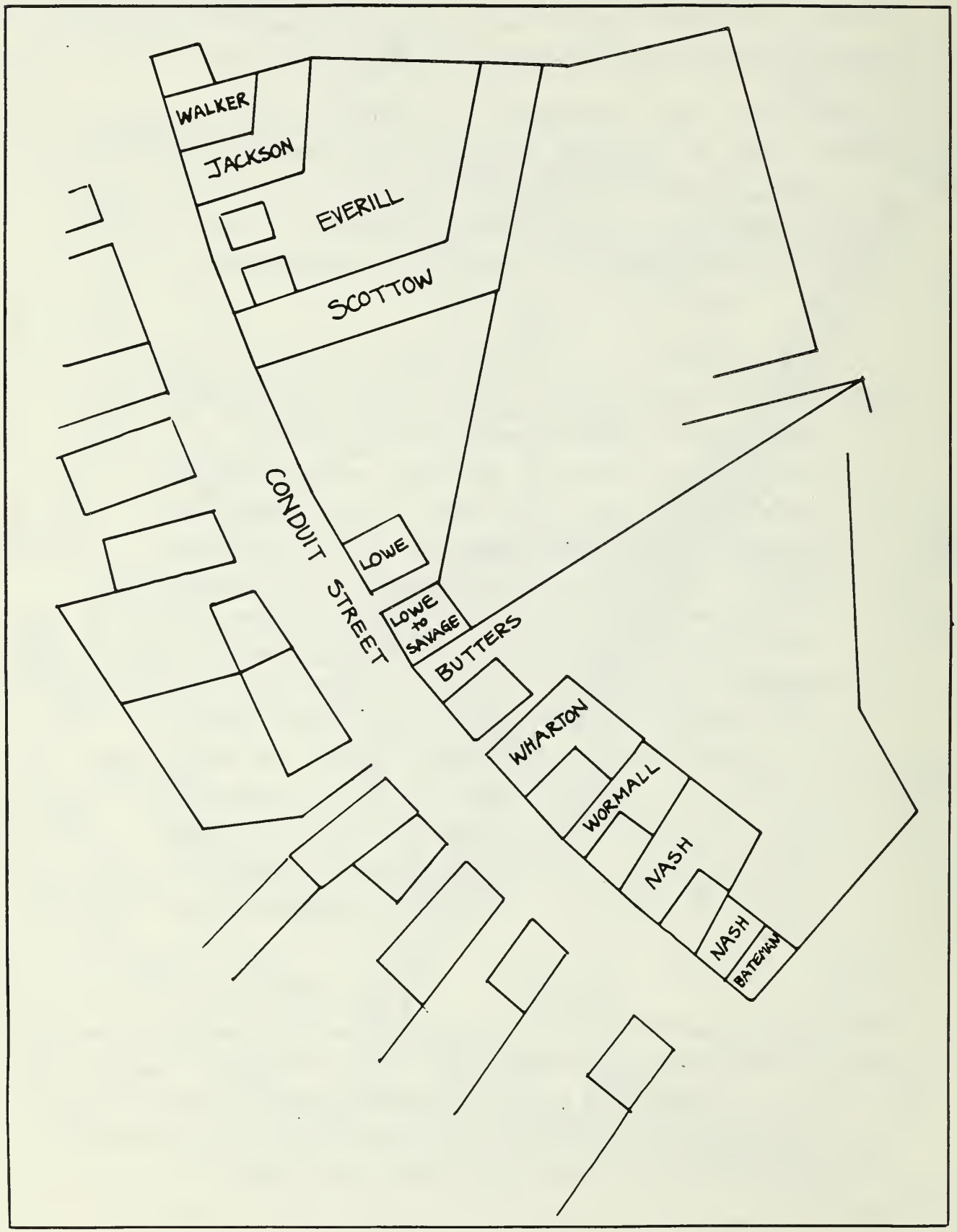
The area soon became known as Scottow's Dock, as shown on Clough's map of 1676 (Map 8). The deeds indicate that Scottow's Dock was a focus of commercial activity in the 17th century. A typical deed description is one for the sale in 1681 by Joshua Scottow to John Ballentine for property on Conduit Street:

> A piece of land . . . adjoining unto the land and shop house of said Ballentine [Map 8] and extendeth from thence unto the head of said Scottow's little dock . . . [with] liberty to pass to and from said land through said Scottow's Dock bridge free; also of landing any staves or other goods upon twelve feet in breadth opposite said Scottow's wharf adjoining to the northeast (not suffering them to lie upon said wharf more than twelve hours under penalty of paying double for wharfage) and the privelege of a cartway twelve feet wide leading from said dock into the street between the lands of James Everill, Samuel Walker and Joseph How [later Salt Lane]. Also of the alley or passageway leading from said dock between the lands of Samuel Walker, Edward Shippen and Samuel Sendall into Conduit St. [later Scotto's Alley] (Suffolk Deeds 12:94).

Many of the deeds for the sale of properties near Scottow's Dock mention warehouses and/or the privilege of wharfage, indicating that it was an active dock area, and its importance is perhaps shown by the fact that some of the dock area was owned by the powerful Salem merchants George Corwin and William Brown (Map 8).

Blackstone Block,
Conduit Street frontage, ca. 1654

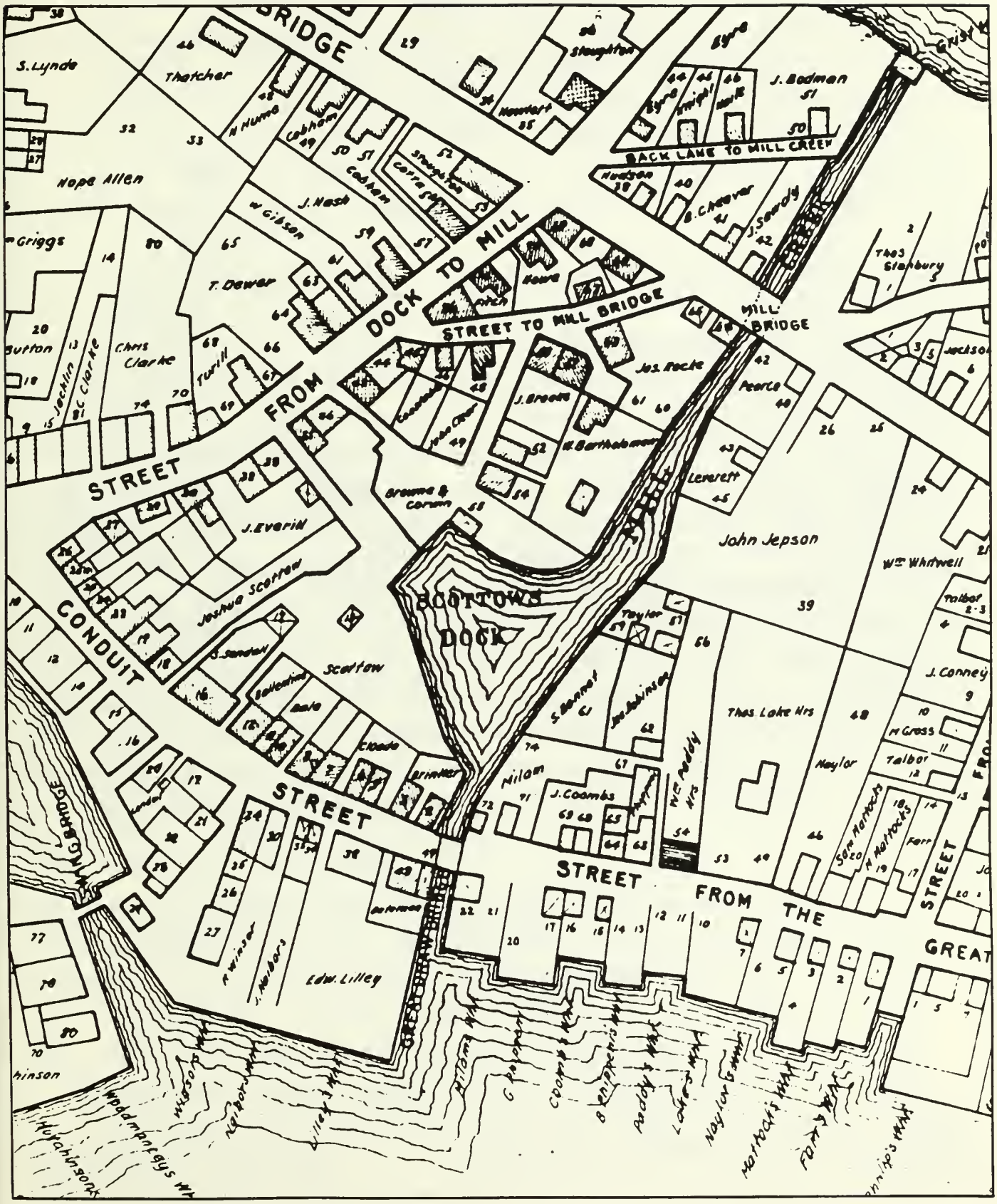
(after Clough draft map, courtesy Massachusetts Historical Society)



Map 7

Blackstone Block,
ca. 1676

(Clough manuscript map, courtesy Massachusetts Historical Society)



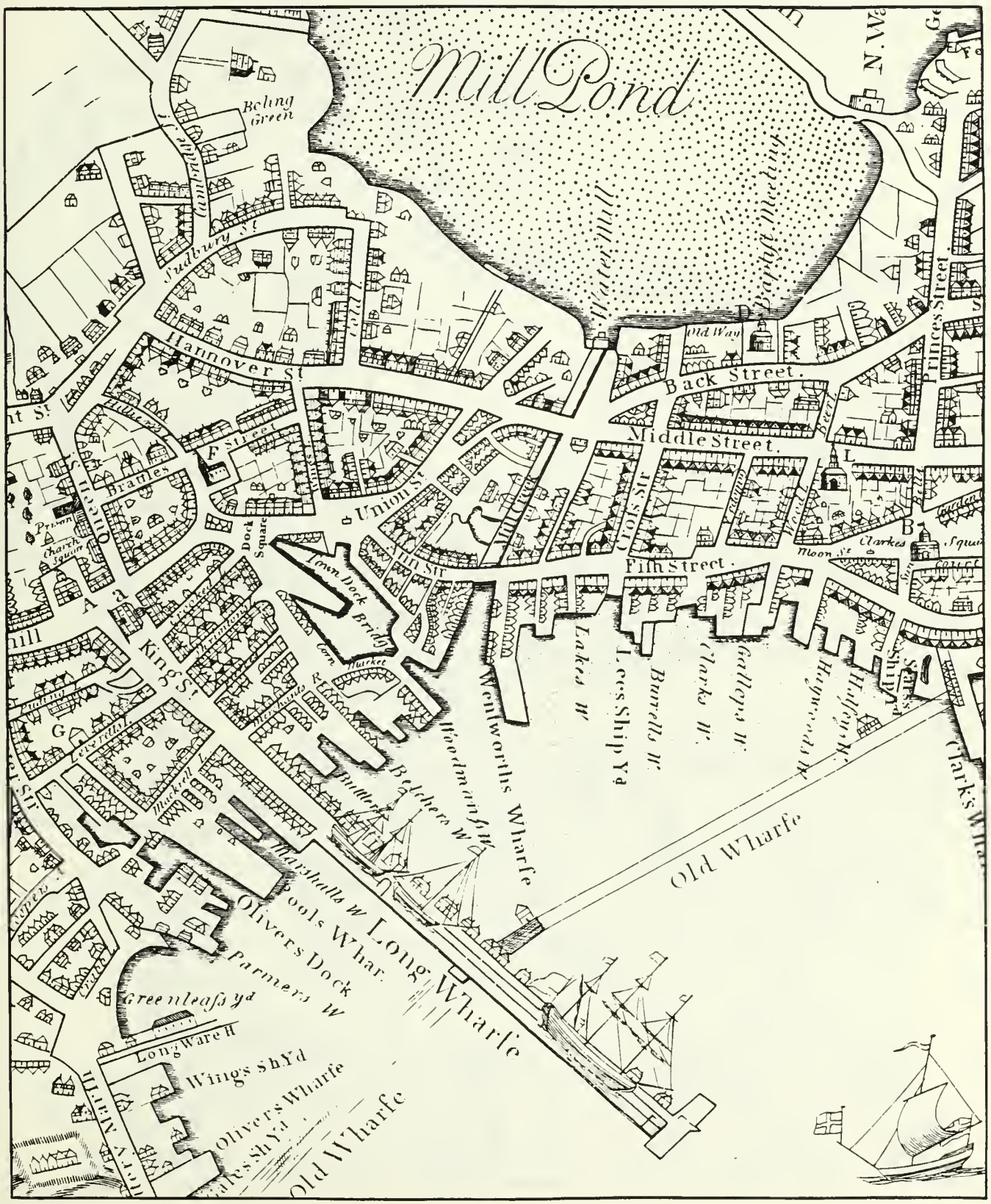
Map 8

While the north side of the future Bostonian Hotel site was being developed as Scottow's Dock, the south side along Conduit (now North) Street was also undergoing changes. The southeast corner of the Blackstone block began to be settled in the 1650s, perhaps because dredging the dock area helped drain the marsh. For example, when James Nash sold some of the marsh behind his house to Joshua Scottow in 1651, Scottow agreed to "raise" the rest of the land behind Nash's house (Suffolk Deeds 1:177). By the mid 1650s most of the land along Conduit Street had been divided into house lots (Map 7).

Deeds for properties along Conduit Street often granted not only wharf privileges but also rights to water from the conduit, a covered reservoir about twelve feet square set up in 1652 near the intersection of Union and Conduit streets to supply water for household use and for fighting fires. Fires were a constant danger; a famous one in 1679 started near the drawbridge and destroyed property along Conduit Street. Some deeds indicate the damage: in 1683 John Bonner sold "my piece of land . . . which I purchased of Bozoun Allen [in 1677] with a dwelling house on part thereof then standing since consumed by fire" (Bowditch n.d.:32:162), and when Joshua Scottow sold his property on Conduit Street to Edward Shippen in 1681, he gave free use of the alley "which is to lie as the fence stood before the late fire" (Suffolk Deeds 12:78). The Conduit Street area was also becoming more commercial; some deeds such as the one from Scottow to Ballentine in 1681 mention shops and this trend was also true at the north end of the block near Hanover Street (Cummings n.d.).

Commercial development continued in the 18th century, although Miguel Gomez-Ibanez states in a recent article on the Blackstone block that after Long Wharf was built in 1711 economic focus shifted away from the Town Dock area (Gomez-Ibanez 1977:21). Nonetheless, Scottow's Dock, or Ballentine's Dock as it was also called after 1711 when John Ballentine acquired Scottow's original property, continued to be commercially active and deeds continue to refer to Scottow's Dock, wharf privileges and warehouses.

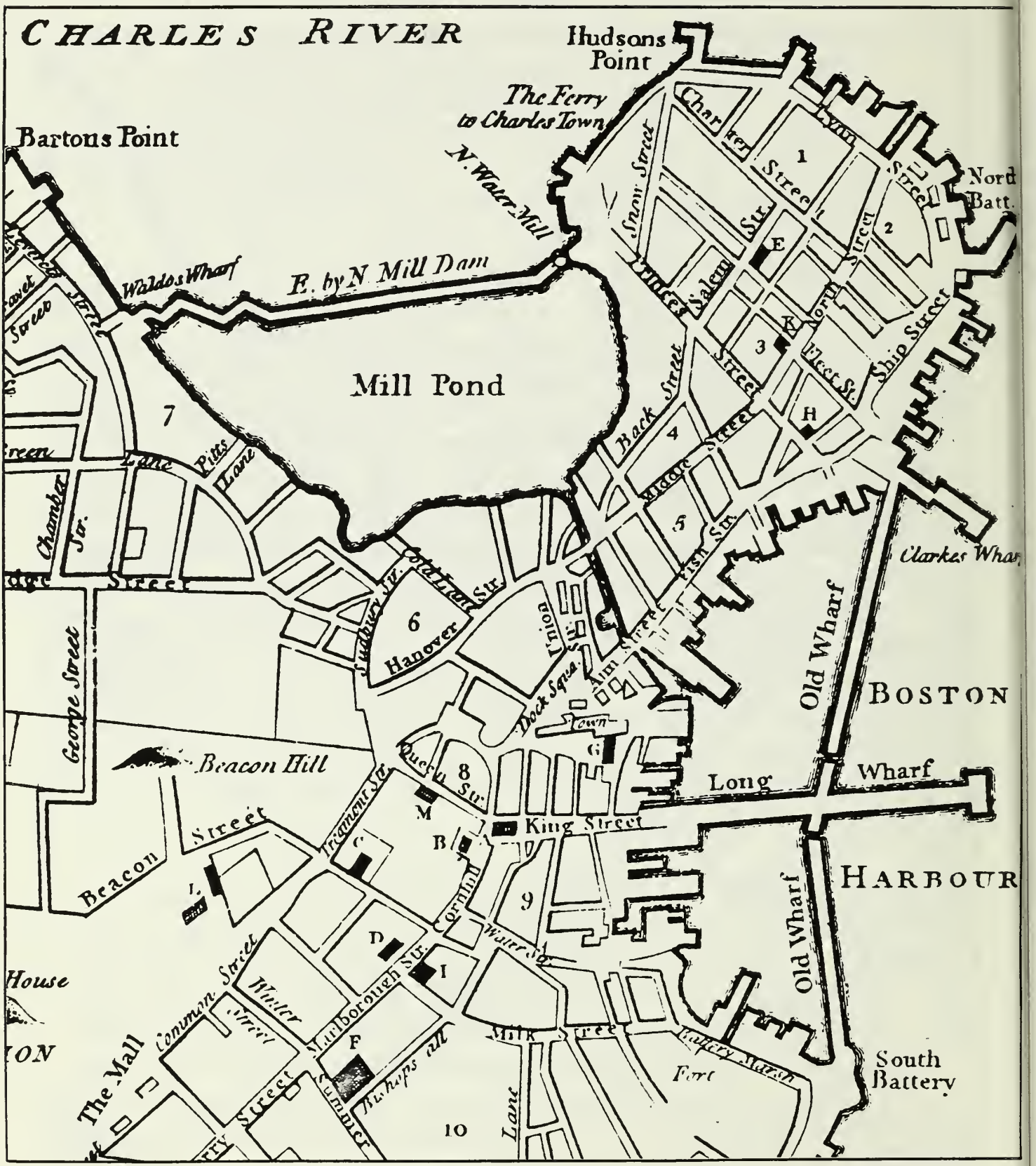
Blackstone Block area,
ca. 1722
(from Bonner map)



Map 9

Blackstone Block area, ca. 1774

(from Gentlemen's Quarterly Magazine, Willard 1968)



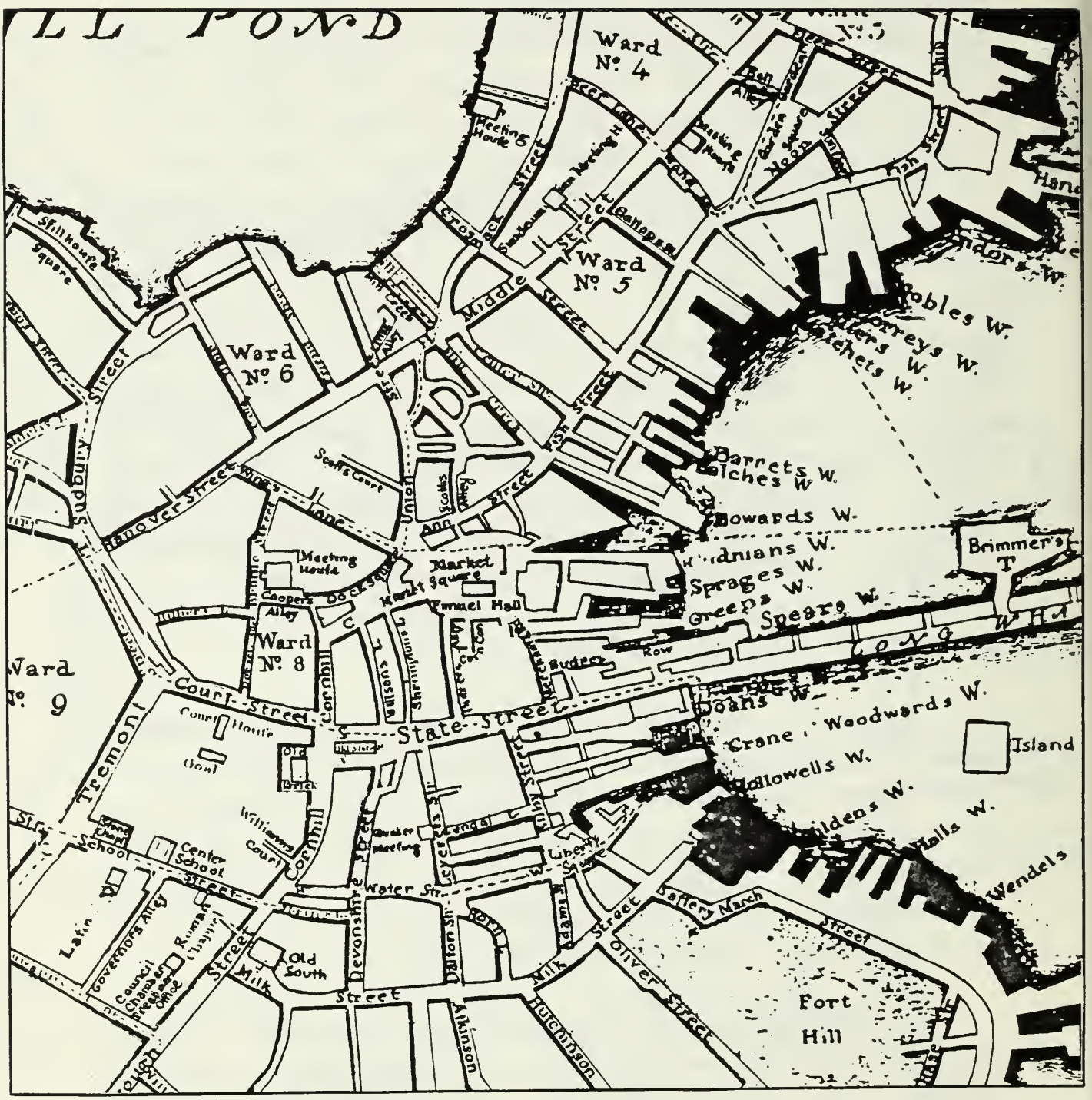
Map 10

Scottow's Dock does not appear on 19th century maps of Boston, and one wonders how long it existed. The inlet off Mill Creek is clearly shown on Captain John Bonner's map of 1722 (Map 9), the first detailed map of Boston drawn by a contemporary observer, and remained unchanged on subsequent versions of the map. The inlet appears on maps as late as 1774 (Map 10). However, the inlet does not appear on Osgood Carleton's large map of 1800 (Map 11), drawn from actual surveys, or on his map of 1795. One wonders whether Carleton's map was inaccurate or whether the inlet had in fact been filled in. As late as 1786 a deed for land near the dock area (No. 15, Map 12) granted the "privilege of landing upon the wharf" (Suffolk Deeds 158:160) and one in 1788 in the same area (No. 44, Map 12) gave the right "of landing wood or any goods or merchandise for the use of said house . . . at the said dock" (Suffolk Deeds 163:227). But by 1798 when the land originally belonging to Scottow was sold to Joseph May (Nos. 13 and 16, Map 12), there was no mention of any wharf and the boundaries of the lot are described simply in terms of compass readings and abutters (Suffolk Deeds 190:51). It would appear, then, that the Scottow's dock area was filled in in the 1790s; this is indirectly confirmed by Thwing's statement that in 1788 Thomas Makepeace and others were allowed to fill in part of the Mill Creek (Thwing 1920:87), which would certainly have made Scottow's Dock less accessible.

The demise of Scottow's Dock at the end of the 18th century is a good point at which to assess the character of the Blackstone block neighborhood. For 1798 there is information from the Direct Tax of 1798 (the federal government's short-lived attempt at a real estate tax), the Boston Directory (an annual list of all Boston residents and their occupations which began to appear regularly in 1798), and one of Clough's most finished maps (Map 12).

From these sources, it is clear that Conduit (changed to Ann in 1708) and Union Streets were lined with shops. Unfortunately, the business is not always specified, but some are known. For example, going west along Conduit (Ann) Street, and referring to Clough's

Blackstone Block area,
ca. 1795
(from Osgood-Carleton map)



Map 11

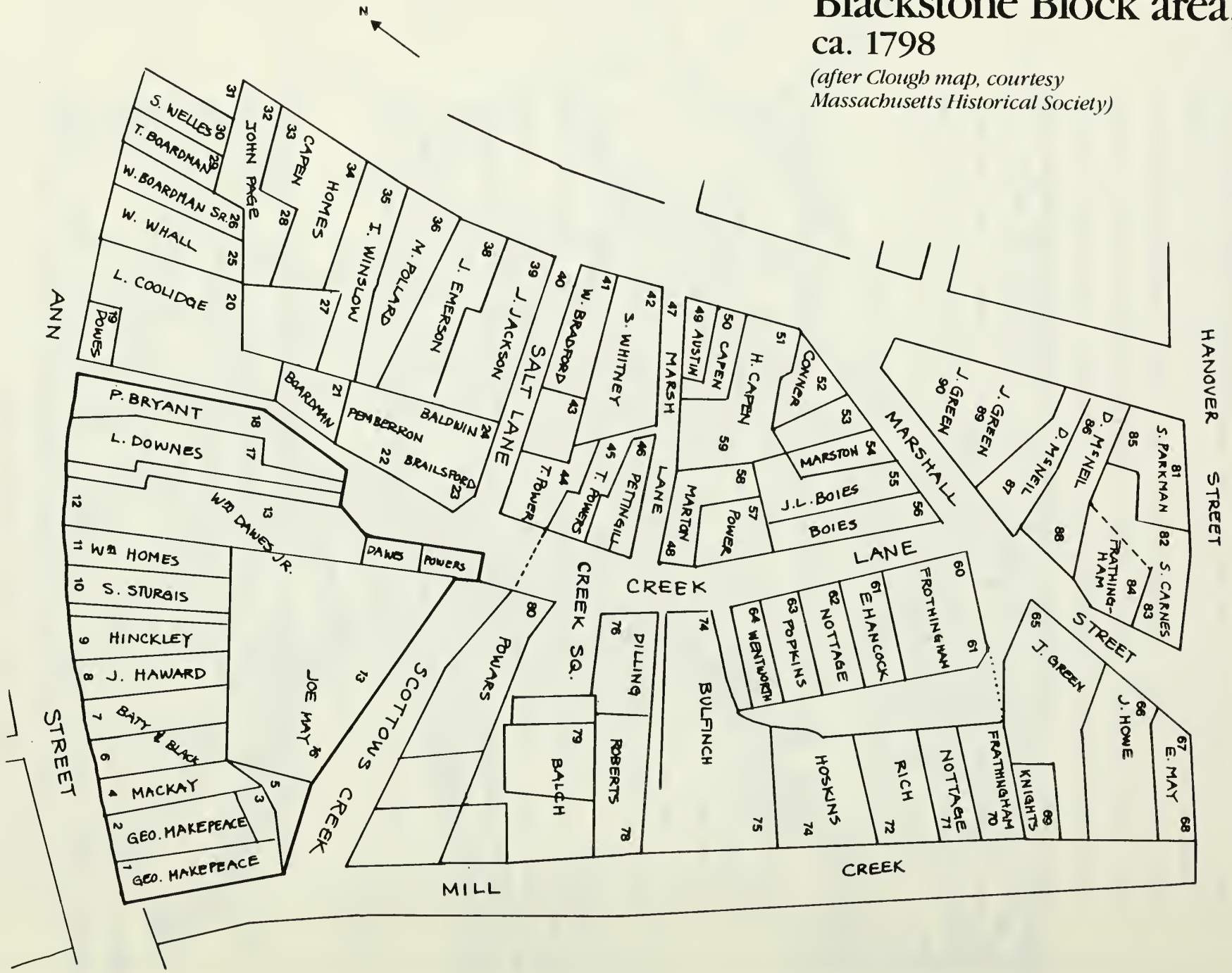
map of 1798 (Map 12), Samuel Sturgis was a hatter, William Homes a goldsmith and jeweller, Perez Bryant & Co. had a boot and shoe store, Samuel Welles a hatter's shop, and Samuel Whitwell a tavern. Then going through Scotto's Alley to the interior of the block, there was another hatter (William Boardman), a plumber and glazier (Norton Brailsford), a butcher (Enoch Baldwin), two blacksmiths (Thomas and Edward Powers), and a shoemaker (Thomas Dillon); Joseph May was a merchant from Long Wharf who lived elsewhere in Boston, and Nathaniel Balch was a hatter on Union Street. If any industry predominated in all this, it was hat-making, and the area just north of Creek Square was known as Hatter's Square in the 19th century.

In the early 19th century topographical events elsewhere in Boston had a far-reaching effect on the Blackstone block. In 1804 the heirs of the original Mill Proprietors were incorporated as the Boston Mill Corporation and by 1807 had received permission to cut down Beacon Hill and to fill the Mill Pond. At about the same time the Town Cove and Dock areas were also being filled in. With both bodies of water it connected no longer in existence, the Mill Creek served no function, so it too was filled. Hale's map of 1814 shows Mill Creek covered with wood, and in 1833 Blackstone Street was laid out on the site of the old Mill Creek. Blackstone Street and 19th century development produced many radical changes in the Blackstone block: the area lost its residential character and became primarily commercial and a center for food and clothing stores (Gomez-Ibanez 1977:27).

In reviewing the history of the Bostonian Hotel site during the 17th and 18th centuries, the most important feature is the development of Scottow's Dock. And yet, the existence of this area was unknown at the beginning of the study. Scottow's Dock had not completely disappeared from historical light: Thwing mentions it in her book (Thwing 1920:87) and Winsor realized that Mill Creek was navigable (Winsor 1881:1-533-34, n.3). Apparently because it was overlooked by the two leading historians of Boston's topography - Nathaniel Shurtleff in the 19th century and Walter Muir Whitehill

Blackstone Block area, ca. 1798

(after Clough map, courtesy Massachusetts Historical Society)



Map 12

in the 20th - it had fallen into obscurity. Investigation into the Bostonian Hotel site has revived an interesting, and perhaps significant, part of Boston's history.

CHAPTER III

SOIL CHEMICAL PROPERTIES OF THE CULTURAL FILL AT THE BOSTONIAN HOTEL SITE

This is a preliminary description and interpretation of data on the chemical properties of selected samples of fill and natural deposits taken from the Bostonian Hotel site, Boston, Massachusetts.

Previous studies (Cook and Heizer, 1965; Limbrey, 1975; Davidson and Shackley, 1976; and others) have shown that many activities associated with human occupancy of a site produce chemical changes in the soil of the occupied site (enrichment of the soil in one or more chemical constituents). To a certain extent, these chemical changes can be used to reconstruct the types of activities which took place at the site at some time in the past. This type of study has been undertaken primarily at prehistoric archaeological sites, although it has been applied to soils in at least one historic site (Keeler, 1977). Most previous studies have been concerned with determining and interpreting cultural chemical changes in natural soils, by comparing the chemistry of occupied soils with that of unoccupied natural soils in the same area.

At the Bostonian Hotel site, the sediments are not natural soils altered by human occupancy, but rather they are layers of fill transported and deposited by people to fill in a small embayment of Boston Harbor. The exact origin of the fills is unknown, and they seem to contain a wide variety of materials, including garbage, debris from burned buildings, and possibly some soil material. This study of the fill at the Bostonian Hotel site differs from previous studies. The purpose of this study is to identify, as far as possible, the kinds of material present in each layer of fill. We hope to be able to distinguish, for example, between household garbage and waste from small manufacturing shops. Because chemical analysis has not been applied previously to historic landfills to our knowledge, this study is

somewhat experimental in nature, and the results must be considered preliminary. These preliminary conclusions based on chemical analysis will be tested against two independent sources of data on the nature of the fills: a content analysis comparing the relative weights of different kinds of material present in bulk samples taken from the fill, and an analysis of the types of plant pollen present in each layer of the fill. These two analyses are not yet complete.

Twenty samples taken from different layers of fill at five profiles exposed in the excavation for the Bostonian Hotel were analyzed. These samples were submitted for chemical analysis to the Soil and Plant Testing Laboratory of the Suburban Experiment Station, U. S. Department of Agriculture Cooperative Extension Service, Waltham, Massachusetts. The samples were analysed according to standard procedures for determining the chemical status of agricultural and garden soils (extraction by a 10% solution of sodium acetate in 3% acetic acid at pH 4.8). Samples were tested for macronutrients (P, K, Ca, Mg), micronutrients (Zn, B, Mn, Mo, Cu, Fe), and some toxic elements (Pb, As, Al). The procedure tests for only the amount of each element which is in an available form - that is, which can be easily taken up by plant roots. For most of the elements, a larger amount of the element may be present in the sample in a form which is unavailable (bound in insoluble compounds). The data therefore do not provide information on the total amounts of each element which are present. Funding was not available to perform the more expensive total elemental analysis.

Another limitation in the available data is the lack of control samples with known contents. For example, we do not know the typical chemical profile of a sample composed entirely of household garbage from 17th century Boston, or the typical chemical profile of 17th century shoemaker's waste. Information on the chemicals associated with particular manufacturing activities and household activities was drawn from reference books and published studies of archaeological sites, and the preliminary conclusions about this site are based on this limited background information.

A third limitation in the available data is the fact that the samples were processed in two batches under slightly different procedures, due to an equipment failure in the laboratory. Profiles B, K and L were processed in batch 1 and profiles D and F were processed in batch 2. Although absolute values of the element concentrations are not exactly comparable between the batches, the relative amounts are comparable.

Results of the chemical analysis are given in Appendix A. The significance of each element for interpretations of human activities and a summary of preliminary interpretations are discussed below.

Phosphorus: Most P added to soil is rapidly bound in insoluble compounds, especially in the presence of Ca which is abundant at this site. Therefore, available P is low in all samples analysed from this site. The analysis is not representative of total P, which may in fact be culturally enriched at this site. I have assumed that those samples which are relatively high in available P, compared to other samples from the site, are highest in total P. The highest value of available P was found in sample B-4, described as ash and dark brown organic fill. Relatively high levels were also found in samples B-3 (dark brown organic fill) and K-3 (olive brown clayey sandy fill). In archaeological sites, P is concentrated in food preparation areas and middens (Griffith, 1981), and in areas where human or animal excrement is deposited (Keeler, 1977).

Potassium: The main source of K in archaeological sites is wood ash. K is generally soluble in the soil environment, so cultural enrichment of K in one layer may be leached down to underlying layers which were initially low in K. At the Bostonian Hotel site, however, K concentrations fluctuate from one layer to the next, so leaching probably has not affected the distribution of K in the fill layers. All samples except D-7 and F-3 show moderate to very high levels of available K. Profiles B, K and L show very high levels of K, suggesting cultural enrichment of this element in almost all of the

fill. There appears to be a relationship between high K concentrations and two types of materials - ash (sample B-4) and marine peat (samples L-4, L-5, and L-6).

Calcium: Ca is moderately soluble at soil pH levels found at this site. The major anthropic sources of Ca are bones and shell primarily, with animal tissues also providing some Ca. All samples from the Bostonian Hotel site have very high levels of available Ca, indicating cultural enrichment. The undisturbed marine peat samples (L-5 and L6) also show very high levels. Profiles D and F have higher Ca levels than profiles B, K and L, but this difference may be due to differences in lab procedures.

Magnesium: High concentrations of Mg at archaeological sites are associated with wood ash and bones (Griffith, 1981). At the Bostonian Hotel site, highest levels of Mg are in samples B-6, L-5 and L-6, indicating that marine peat also is high in available Mg. In Profiles B, K and L, all layers identified as organic fill have moderately high to high Mg levels. The source of this Mg is probably food garbage or fireplace ash as these profiles do not seem to contain significant levels of marine peat.

Boron: In soils, Bo behaves like Al, which is immobile at pH levels higher than 5.5. There are no obvious anthropic sources of Bo. Marine peat is relatively high in Bo, as evidenced by samples B-6, L-5 and L-6.

Copper: Cu has very low mobility in most soil environments. Therefore, available Cu levels are low in most of the Bostonian Hotel site samples, and Cu varies greatly from one layer to the next. Available Cu is low in the marine peat samples. The most likely anthropic sources for Cu are metal artifacts and pottery glazes (Bolt and Bruggenwert, 1978). High Cu levels at the site came from layers deposited or disturbed during 20th century construction activity (samples F-1 and K-l' 6"), and from dark brown organic fill deposited in the mid-18th century (samples B-1 and B-3).

Molybdenum: Mo is mainly insoluble in soil environments. Mo is found in modern steel and alloys, and in modern pigments (Bolt and Bruggenwert, 1978), but it is not clear whether 19th and 18th century pigments would contain it or not. Available Mo is very low in all of the Bostonian Hotel site samples. There is no evidence for anthropic enrichment of Mo at this site.

Iron: Fe is naturally high in soil minerals, but it is relatively insoluble except at pH levels lower than those measured at the Bostonian Hotel site. Available Fe was very high in the marine peat samples(L-5 and L-6) and in samples which probably contain some marine peat mixed with cultural deposits (L-4 and F-3). Two layers which were recently disturbed (B-1 and F-1) are also high in available Fe, probably from 20th century pipes and utility lines. In addition, one sample (D-5) containing building fire debris was also high in available Fe, probably due to weathering of iron building materials.

Zinc: Zn is relatively soluble at pH levels between 5.3 and 6.4, but its solubility drops off above pH 6.4. At the Bostonian Hotel site, available Zn levels are highly variable from one layer to the next, suggesting that there has not been any leaching of Zn. This variation in Zn appears to be independent of pH. Therefore, the moderately high levels of available Zn found in a few samples (B-3, B-4, K-1' 6", L-1, D-6) are probably due to the presence of zinc-rich artifacts within individual layers of fill. The Zn in samples L-1, K-1' 6" and F-1 may be derived from materials used in 20th century street and utility construction. Five samples which were not affected by recent construction activities (B-3, B-4, B-6, D-6 and F3) have moderately high Zn concentrations. Available Zn is very low in the marine peats and clays (samples L-4, L L-5, L-5'10"). Bolt and Bruggenwert (1978) state that Zn is found in ink and paint.

Manganese: Mn behaves similarly to Fe in soils. It is relatively insoluble at soil pH levels found at the Bostonian Hotel site. There

is, however, little correlation between available Fe and available Mn in the samples tested, so these two elements are coming from different sources. There is high sample-to-sample variability within profiles in Mn concentration, and there is no evidence of leaching within the profiles. Available Mn is very high in the marine peats and clays (samples L-4, L-5 and L-5'10"). The very high Mn levels in samples B-9, D-6 and D-7 are probably due to the presence of some artifact, but the specific type of artifact responsible is not known.

Aluminum: Al is abundant in natural soil minerals, but it is relatively immobile at pH levels above 4. Available Al concentrations at the Bostonian Hotel site are generally low and are strongly related to pH. The samples with highest available Al (samples L-5, L-5'10", D-5) have low pH. Variations in available Al apparently are not due to cultural enrichment.

Arsenic: As behaves similarly to P; that is, it is largely insoluble in soil environments, especially in the presence of Ca. Paint pigments, textile manufacturing and tanning are all potential cultural sources of As (Bolt and Bruggenwert, 1978). Although there is evidence of leatherworking debris in profile F, available As concentration is very low in this profile and, in fact, in all the samples tested. There may be some cultural concentrations of As in the fill material, but it cannot be detected by the chemical analysis procedures used. Highest As levels detected at the site were found in the marine peat layers (L-5, L-5'10").

Lead: Pb is subject to slight leaching in soils (Bolt and Bruggenwert, 1978). The major anthropic sources of Pb are probably paint, metal artifacts and ceramic glazes. Pb is very low in the marine peats and clays. High levels of Pb in profiles B, D and F are probably due to cultural concentrations. Sample B-8 has a moderately high Pb concentration, although it is low according to standards based on human health hazards (Soil and Plant Testing Laboratory 1981). This sample is also high in Zn, Cu and Mn, possibly indicating the presence of some type of metal artifacts. Samples D-5 and

D-6 are high in Pb but not in Zn and Cu. In this case, the Pb concentration may be due to paint or ceramic glazes. Samples F-1 and F-3 also show moderately high Pb concentrations.

Summary

The evidence from the Bostonian Hotel site suggests that soil chemical analysis can play a valuable role in the interpretation of complex urban sites in several ways. Differences in chemical composition can help identify and differentiate the components of superficially homogeneous deposits. Soil chemicals can also indicate the extent to which natural soils or peat were incorporated in fills. Used in conjunction with pollen studies, these analyses provide a basis for reconstructing period environmental setting and patterns of land use.

Soil chemical analysis can also be used to identify specific cultural activities from the archaeological reocrd. At present, however, the chemical enrichment left by particular activities is not clear enough to use in a reliable manner. For example, how does domestic fireplace ash differ from the general burned debris which results from a burned building; is the discard from a tannery demonstrably different from that from a hat maker? The data from the Bostonian Hotel site suggest that distinct chemical signatures do exist, and that with additional testing from other sites, these analytical tools will emerge more clearly.

CHAPTER IV

EXPLORATORY POLLEN ANALYSIS OF THE BOSTONIAN HOTEL SITE SEDIMENTS

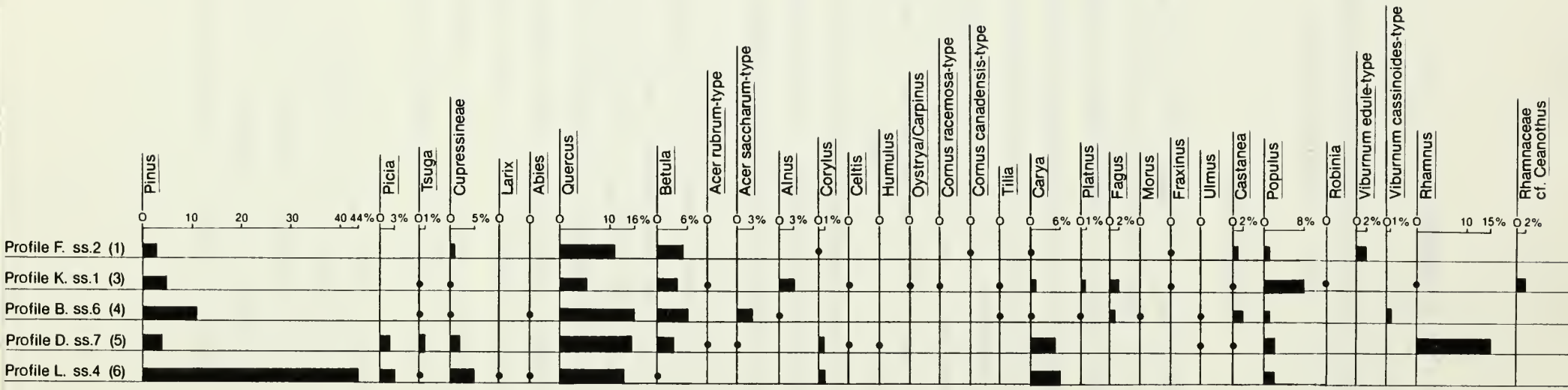
Introduction

Pollen analysis has been a primary tool in palaeoenvironmental investigations for over 70 years and during the last 20 years has become almost a standard part of archaeological projects in the arid portions of western North America. In temperate regions, such as New England, pollen analysis of archaeological matrices are not often attempted because oxidization and high concentrations of fungi destroy most of the pollen in such sediments (King, Klippel and Duffield 1975). Those sites from which successful pollen analysis has been reported are located in marsh sediments comparable to those often employed in palaeoenvironmental pollen studies (Benninghoff 1942; Deevey 1948) or involve correlation of archaeological materials with pollen data from lacustrine sources (Bonny 1976).

This pollen study of the Bostonian Hotel site sediments is therefore largely exploratory. The sediments involved were ultimately deposited in a marine environment where, with free oxygen and fungi largely excluded, preservation should be excellent. The archaeological data, however, suggest that much of the matrix has a cultural origin and was intentionally dumped into the small embayment on the Boston Peninsula. The pollen content of such material might have degraded badly before it ever reached our sampling locality.

Our primary objectives have been to determine whether pollen preservation has been sufficiently good to warrant further analysis and to determine whether there are contrasts between the pollen spectra derived from separate time intervals or contemporaneous cultural episodes which might be worthy of further exploration.

Bostonian Hotel site,
Arboreal Pollen Types



Profile Key

(1) Blue-gray clay mixed with organic fill
(2) Gray ash lense
(3) Dark brown organic fill
(4) Dark brown organic fill
(5) Dark brown-gray organic fill
(6) Blue-gray marine clay.

• < 1%

Figure 19

Methods

Six samples dating from pre-occupation levels through the filling process at the site were analyzed at the palynology laboratory of the Boston University Center for Archaeological Studies. These samples included: the blue-grey marine clay (Profile L, ss. 4) immediately underlying the cultural fills, a dark brown-grey organic fill dating to the mid 17th century (Profile D, ss. 7); a dark brown organic fill (Profile B, ss. 6) dating to the early 18th century; a dark brown organic fill (ss. 1) and an ash lens (ss. 4) from Profile K dating to the same interval; and a blue-grey clay mixed with brown organic fill (Profile F, ss. 2) dating to the latter part of the 18th century.

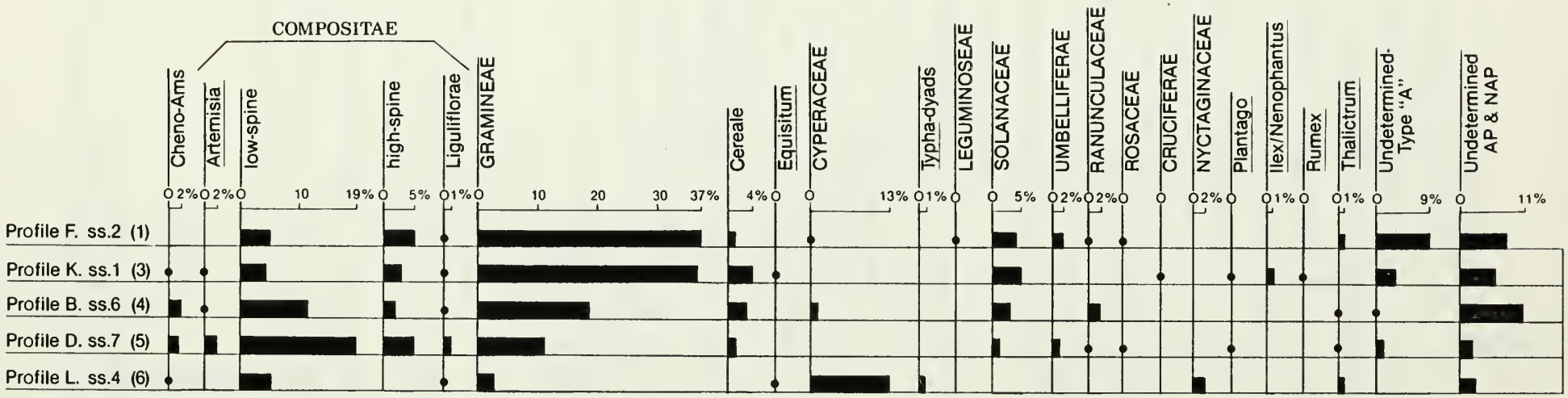
Extraction followed Mehringer (1967) and pollen residues were mounted in glycerol for viewing. Two hundred pollen grains were tabulated (Appendix D) for all samples except the Profile K, 8' sample, which received a 207 grain count, with a compound transmitted-light microscope at 400x. Problematical pollen grains were examined under oil immersion at 1000x. Identification of pollen types is based on McAndrews, Berti and Norris (1973), Richard (1970) and the pollen reference collection of the laboratory. Terminology follows R. B. Davis et al. (1975), except that the wind-pollinated members of the Compositae family, other than Artemisia, have been lumped under the term "low-spine Compositae."

Pollen influx sums were computed by Benninghoff's (1962) exotic pollen addition method as a check on comparative pollen degradation. The data for individual pollen taxa are, however, presented in terms of relative pollen frequencies (%). See Figures 19 and 20. Pollen influx frequencies are of limited utility in the absence of information concerning the rate at which pollen matrices accumulated.

Results

Pollen preservation was excellent in five of the Bostonian Hotel site samples. One sample, the early 18th century grey ash (Profile

Bostonian Hotel site,
Non-Arboreal Pollen Types



Profile Key

(1) Blue-gray clay mixed with organic fill
(2) Gray ash lense
(3) Dark brown organic fill
(4) Dark brown organic fill
(5) Dark brown-gray organic fill
(6) Blue-gray marine clay

• < 1%

Figure 20

K, ss. 4) contained virtually no native pollen. Pollen is destroyed in fires, but we had hoped to recover a sample of the local pollen rain during the interval between the burning and the ultimate deposition of the ash in the embayment.

The Pre-Colonial Period

The Blue-Grey Marine Clay: This sample is dominated by pine pollen. Sixty percent (52 grains) of this pollen is assignable to white pine-type (Pinus strobus), three percent (3 grains) are assignable to jack pine-type (P. banksiana) and one percent (1 grain) is probably derived from red pine (P. resinosa). The remaining thirty-six percent is made up of pine pollen bladders summed to equal whole grains. Oaks (Quercus) and sedges (Cyperaceae) were the next most prominent pollen contributors to the blue-grey clay while smaller, but possibly significant, quantities of hickory (Carya), cedar or juniper (Cupressineae), spruce (Picia), wind-pollinated Compositae (low-spine-type) and poplar (Populus) pollen were also present.

The blue-grey marine clay can almost certainly be assigned to Deevey's (1939) "Pine Period," most reliably dated at 9,700 to 4,700 B.P. (R. B. Davis, et al. 1975), on the basis of its high relative frequency (44%) of pine pollen and its low ratio of jack pine-type to white pine-type. This count is not part of a local Holocene sample series, and just where it should fall within this considerable time range is not readily apparent. The pine percentage itself, plus the relatively low incidence of oak (13%), the 3% contribution of spruce and the virtual absence of hemlock (Tsuga) suggest deposition during the earliest portion of the pollen zone when compared to the pollen spectra of lacustrine sediments from Connecticut (M. B. Davis 1969) and Maine (R. B. Davis, et al. 1975). The hickory and cedar/juniper counts, on the other hand, suggest a date very near the end of the period. The most peculiar aspect of the pollen spectrum is the low incidence (1 grain) of birch (Betula). This type should constitute 10% to 30% of the count.

The nature of our sampling locality at the time of deposition may have something to do with these anomalies. Recent studies have established that the majority of the pollen grains, up to 89% (Bonny 1976) in marine and lacustrine sediments arrive there by water rather than by air and that these are not uniformly deposited. Pine pollen is especially subject to such differential transport and sedimentation (Brush and Brush 1972). The majority of the pine pollen grains in marine sediments originate in inland rather than in coastal plant communities (Huesser and Balsam 1977) and, with other light types, travel further in the water than the heavier pollen types (Muller 1959). They tend to remain suspended until they reach an area of low turbulence (Traverse and Ginsburg 1966) and tend to be deposited with finer-grained sediments (Muller 1959; Fall 1981). The location of the blue-grey clay in a sheltered embayment on a larger body of water which receives the discharge of a number of rivers and streams seems to fulfill the requirements for an over-representation of pine and a distortion of the contributions of other pollen types rather nicely. Little of the tree pollen, at any rate, originated at our sampling site.

In contrast to pine pollen, the pollen of sedges is not produced in massive amounts (Wodehouse 1971) and significant quantities of it are found in terrestrial surface samples only in the immediate vicinity of the parent plants (Meyer 1973). It will move in water (M. B. Davis; Brubaker and Beiswenger 1971) but as a heavy type, it should not travel great distances in relatively large bodies of water. The cattail (Typha) dyads noted in the blue-grey marine clay appear to be the remains of broken tetrads. Such pollen does not blow far (Wodehouse 1971) and tends to be very localized in lacustrine sediments (M. B. Davis; Brubaker and Beiswenger 1971). The plants producing both pollen types were probably growing quite close to the sampling locality and the edges of the embayment must have been quite moist with fresh water. It might even be suggested that this particular clay layer was deposited in fresh water. The area was certainly not a salt marsh. Under those conditions salt marsh grasses, such as Spartina, should have contributed more than the 2½% grass pollen noted.

The Colonial Period

In dealing with the Colonial period sediments, we must take the human factor into account in addition to pollen transport and sedimentation. Much, if not most, of this matrix was intentionally dumped into the embayment. Its pollen spectra could be augmented by the pollen of food plants in garbage and the pollen of weeds whose proliferation was encouraged by increases in soil disturbance. An increase in the weed pollen contribution should also bias the representation of other types where relative frequencies are employed.

Arboreal Pollen Types: Our sampling locality was submerged for the greater part of the Colonial period. Most of the arboreal pollen grains in the fill of this period are probably derived from regional pollen sources by water transport. With the exception of the oak counts, the tree and shrub pollen spectra of the European occupation era contrast sharply with those of the blue-grey clay. This must be largely due to environmental change during the intervening 4,000 to 9,000 years, and much of the depression in the pine pollen contribution can be confidently attributed to this mechanism. Historic land clearance is also undoubtably involved, but without data from immediately prehistoric sediments this factor cannot be clearly delineated. The general depression of hickory and the cedar/juniper type counts and the complete loss of spruce above the mid 17th century sample seem to fit into the land clearance category. Both the number of samples and the relative frequencies involved are, however, small. These differences could also be a matter of chance.

Several features of the arboreal counts from the Colonial period appear to be attributable to pollen incorporated in dumped fill. The 15% buckthorn (Rhamnus) found in the mid 17th century sample is one such case. These shrubs, or small trees, are usually found in thickets or woods rather than on boggy ground such as characterized the site during the mid 17th century. Only one other pollen grain of this type appears in the sums (Profile K, ss. 1) and we have not seen it listed in any Quaternary pollen diagram from New England. We could

be dealing with the contents of a single anther incorporated in the fill, but no clumps of this pollen type were observed.

The 8% poplar (Populus) pollen in Profile K, ss. 1 seems aberrant when compared to the poplar count of the other early 18th century sample and to what appears to be normal for this type. The depressed oak contribution to the Profile K, ss. 1 sample and the somewhat elevated pine count (11.5%) in Profile B, ss. 6 seem to fit into the same category. The lower oak count may be the statistical product of the larger quantity of poplar pollen present in the same sample. The relatively higher pollen percentage, however, seems to have been bolstered by the addition of an unusual quantity, 10 grains out of 23, of red pine-type pollen. This could reflect an origin distinct from that of the other early 18th century sample. The other sample, Profile K, level 1, also contained a few red pine-type pollen grains (a regional event of some kind?) and we could be dealing with a combination of chance and the statistical suppression of the majority of the Colonial period pine pollen counts by over-representation of grass (Gramineae), wind-pollinated Compositae (low-spine Compositae), poplar and buckthorn.

The poplar count is, at any rate, real and emphasizes the separate sources of the material in roughly contemporaneous fill episodes. The 3% sugar maple (Acer saccharum-type) in the Profile B sample and the 3% alder (Alnus) in the Profile K sample may, although numerically small, reflect the same thing. It is worth noting that the mixture of blue-grey clay with the brown organic fill of the late 18th century sample (Profile F, level 2) does not seem to have had any effect on the counts.

Non-Arboreal Pollen Types: The largest contrasts among the Bostonian Hotel site Colonial period pollen spectra occur in the low-spine Compositae and grass counts. These are also the only differences for this time interval which seem to have chronological significance.

The low-spine Compositae pollen type, incorporating ragweed (Ambrosia), is the premier indicator of European settlement in the eastern United States. It has been demonstrated that it correlates well with agricultural soil disturbance (Solomon and Kroener 1971), and a number of palynologists (Butler 1959; M. B. Davis 1959; R. B. Davis 1967) have used it as a horizon marker for the initiation of cultivation in their study areas. The peak (19%) of this type in Profile D, ss. 7 (mid 17th century) should indicate the interval of heaviest soil disturbance in the area; its subsequent decline through the sample series should reflect progressive stabilization of the soil, or possibly, the reduction of habitat through urban development. It is also possible that the low-spine Compositae counts were simply forced down statistically by the rising contribution of grass pollen. If this is the cause there should be a similar downward trend among the arboreal pollen types, such as oak and birch. Yet, this does not appear to be the case.

A significant question regarding the low-spine Compositae counts is whether most of this pollen is local in origin and reflects the immediate situation or whether it is the product of long-distance transport and indicates regional conditions. Low-spine Compositae pollen is produced in massive quantities and is widely dispersed by both wind (Raynor, Ogden and Hayes 1973) and water. In small lakes, it is preferentially deposited in shallow water (M. B. Davis; Brubaker and Beiswenger 1971), while in large lakes it is carried out into the lake further than at least some of the heavier pollen types (Crowder and Cuddy 1973). The embayment was still flooded during most of the deposition interval and the higher two counts, of this type at least, might contain some pollen from agricultural areas up the numerous streams emptying into Boston Harbor.

We prefer to assign most of this pollen to a local origin. If the trend in low-spine Compositae was regional it should have a mirror image among the arboreal pollen types. The oak and birch sums are too stable for this to be the case and the apparent trend in pine seems to be the product of a single high count. Some low-spine

Compositae pollen does travel great distances, but the majority of the grains come to earth within a few meters of the parent plants (Raynor, Ogden and Hayes 1973: fig. 6, fig. 9). As among some arboreal types, the low-spine Compositae contents of the two early 18th century samples (Profile B, ss. 6 and Profile K, ss. 1) differ considerably, suggesting separate points of origin in either time or space for some of the pollen.

In general, the pollen of native grasses is not produced in massive quantities or dispersed widely in the air (Wodehouse 1971). It is relatively heavy and tends to settle out in water before low-spine Compositae, at least (Crowder and Cuddy 1973). The upward trend in the frequencies of this pollen type through the Colonial period appears to be the product of local plants adapting to culturally related changes in their immediate environment. There are at least two possible interpretations for this trend.

The more plausible explanation would be that draining of the local soil by the dredging of the mill creek in the A.D. 1640s and the accumulation of trash and fill in the area progressively dried the soil and created an expanding habitat for grasses. Other palynologists (Benninghoff 1942; Knox 1942) have employed proliferation of grasses as an indicator of drier conditions in studies of estuary marshes in the Boston area. The slight upward trend in the pollen representation of the nightshade (Solanaceae) is consistent with this interpretation.

The alternate interpretation is that as the embayment filled in, a progressively more shallow salt water habitat for salt marsh grasses, such as Spartina, was created. We were unable to identify the native grass pollen to genus, but it would appear that a number of morphological varieties were present.

Economic Pollen Types: The only certifiable economic pollen type, and the most obvious indicator of human influence on the Bostonian Hotel site pollen spectra, is the pollen of Old World cereal

grasses (Cereale) present in all samples from mid 17th cnetury on. With the exception of rye, the primary European cultivated grasses (wheat, barley, and oats) are self-pollinating. Such pollen, again with the exception of rye, is not commonly encountered in sediments, even in agricultural areas (Iverson 1941). It is not likely that this pollen reflects long-distance water-transported plough wash.

Some local activity is indicated by this cereal grass pollen, and three possible sources may be suggested. The first of these is domestic garbage dumped into the embayment. Chemical analysis of the fill (McDowell, this volume) does not seem to support this line of thought. The second potential point of origin is the grist mills established on the artificial tidal creek which emptied into the embayment after A.D. 1643. A third possible source for the cereal grass pollen is grain spilled from the ships which often loaded in this area. The percentages of this pollen type recorded are quite small (4% maximum) and the differences between them may be a matter of chance. It is worth noting, however, that the highest frequencies of this pollen type occur in the two early 18th century samples when there was still considerable commercial activity on this part of the Boston waterfront.

Summary and Conclusions

The data indicate that the blue-grey marine clay underlying the cultural fill is early to middle Holocene in date and that a fresh water habitat for water-loving plants existed in the immediate vicinity at that time. Further analysis of deeper deposits might contribute to our knowledge of the early Holocene and late Pleistocene environmental sitsituation in the Boston area, but comparative data for the European period will have to be sought at some other locality.

The effects of local and regional pollen sources cannot be clearly delineated in the Colonial period counts, but it appears that most of the arboreal pollen is the product of long-distance transport while the majority of the non-arboreal pollen grains were produced close by.

As a consequence, the arboreal pollen counts appear to be less strongly influenced by human activity than the non-arboreal pollen spectra and the differences among the arboreal sums most clearly reflect the distinct temporal or geographic origins of the various dumping episodes in the fill, recorded in the physical differences among the stratigraphic layers.

The non-arboreal pollen types, led by grass and wind-pollinated Compositae, appear to record progressive drying and stabilizing of the soil through the Colonial period. The pollen of the Old World cereal grasses attests to the at least partially economic nature of the human interference with the local pollen rain; the slight rise of this pollen type during the early 18th century, coinciding with the peak of mercantile activity in the vicinity, implies that a large part of this economic activity was commercial, rather than domestic, in nature.

Because this analysis was exploratory in nature, our conclusions are both tentative and tenuous. Our most positive contribution has been to demonstrate that analysis of other historic period sites of this type, and further analysis at this locality, might prove profitable.

CHAPTER V

SUMMARY AND RECOMMENDATIONS

Despite the shortcomings inherent in a salvage situation, the Bostonian Hotel site provides important information about Boston's growth during the 17th and 18th centuries. This was Boston's formative period when the town's marshy, irregular shoreline was converted into an active, urban waterfront, and when Boston was the largest and most important city in British North America (Whitehill 1968:37).

Summary of Land Use

Although undisturbed post-Pleistocene peat deposits were observed in several of the profiles (E, H, I, J, and L), there was no evidence of prehistoric or pre-1650 colonial occupation. The earliest cultural activity on the site appears to date from the third quarter of the 17th century.

Between 1650 and 1676, three dramatic changes occurred as Joshua Scottow began to improve the property he had purchased. First was dredging parts of the marshy enbayment. The absence of peat levels in Profiles A, A', B, C and K suggest that all are located within the area which Scottow "enlarged." The dredging, of course, was done to improve access to the new docking facilities which he had constructed. The remnants of cribbed wharf exposed in Profile K are probably part of Scottow's original dock.

The third major change in the area was the creation, or reclamation, of land by filling. While dredging had undoubtedly helped to drain the adjacent marshes, additional fill was required to make the land dry enough for building. At least two kinds of fill were used. One was domestic, possibly shop, refuse, as was noted in levels 6 and 7 of Profile D. This kind of debris was used to fill the boggy

back portions of the residential lots which fronted on North Street. The other source of fill was dredge spoil, particularly the blue marine clay. Deposits of blue clay above the peat levels in Profiles H, I, and L suggest that the dredged material was used to raise the ground level behind the wharf front.

In contrast to the drastic changes of the preceding decades, there is little archaeological evidence for late 17th century activity. This is surprising, since Scottow's Dock appears to have been most active during this period. However, it may have been that activity which kept debris from accumulating. Only in level 5, Profile A were deposits present that might be interpreted as from the late 17th century. This lack of 17th century materials in any quantity suggests that either there were strict prohibitions against dumping, or that the area around the dock was periodically re-dredged to keep debris from accumulating.

Filling continued in the area around Scottow's Dock during the late 17th century. In addition to domestic refuse, debris from the periodic fires which plagued Boston was also used as fill (Profile D, level 5).

The first decades of the 18th century were again marked by change. Between 1706 and 1718, property around Scottow's Dock changed hands several times (Clough 1922:46-7; Seasholes n.d.:5). At some point during these transfers, one or more major re-definitions of the waterfront appear to have taken place. Clough's reconstructed map of the Creek Square area for 1706 (Clough 1922) indicates a much more constricted area for ships than does his map for 1676.

Archaeologically, there is also good evidence for the filling in of portions of the waterfront during this period. The process appears to have occurred in two stages. First was the gradual accretion of refuse material in the intertidal zone during the late 17th and early 18th century. The molluscan remains in these deposits indicate a slow rate of deposition and the presence of both a muddy bottom and

a hard substrate such as wharf timbers (lowest portions of Profile B, level 4; Profile C, level 6 and Profile K, level 6). The pollen data indicate a drier, more stable ground cover in the surrounding area.

Some time toward the end of the first quarter of the 18th century, the process of filling picked up considerably. Instead of gradual accretion, filling appears to have been systematic and deliberate. In Profiles A, B, and K, ground level was raised by three to four feet. These fill deposits were rich in material remains and contained refuse as varied as the community which produced it. This included domestic refuse, debris from building and rebuilding activities and the discard of local businesses, particularly butchering and shoemaking. The high percentage of mugs, bottle glass, pipes and food remains in these deposits may be a reflection of the several nearby taverns. Ceramic mean dates for these deposits range between 1715 and 1723; smoking pipe stem bore dates range between 1720 and 1735.

During the second quarter of the 18th century, commercial activity shifted away from the older, more constricted wharves to Long Wharf and other new waterfront facilities which were built into the harbor. Less accessible and unable to handle large vessels, the older wharves like Scottow's Dock became less viable and began to stagnate. Archaeologically, this period was represented by only one deposit (Profile C, level 5) which suggests that debris continued to collect in the intertidal zone through mid century.

The last decades of the 18th century represent the last stages in the evolution of the site area. The combination of marginally valuable waterfront with a rapidly growing demand for land where new commercial buildings could be constructed near the waterfront led to the final filling of what had been Scottow's Dock. While the exact date is not clear, documentary sources indicate the area was filled between 1790 and 1800. The archaeological evidence also indicates major fill episodes some time during the last quarter of the 18th century

(Profiles F and G); ceramic mean dates for these deposits range from 1768 to 1781. These terminal fill episodes are difficult to interpret fully, since their upper portions have been either destroyed or severely disturbed by later construction activities.

Research Recommendations

In addition to reconstructing patterns of land use, several other research questions can be addressed with the data from the Bostonian Hotel site. Two general directions for further research are suggested here.

The first is comparative study with other 17th and early 18th century waterfront sites. At present, few similar sites have been described in the literature. Several reports are currently being completed, however, and gradually the data for comparative analysis are becoming available. Among questions that can be addressed are:

-- How similar was the evolution of urban commercial waterfronts along the North Atlantic coast?
-- Were there discernible regional preferences or differences in construction techniques or materials used?
-- Where were the centers of innovation (where were new construction methods devised and employed)?

Given the importance of maritime commerce in colonial America and the relative lack of information on the physical evolution of waterfronts in the documentary record, archaeological analysis is most likely to produce answers to these questions.

Another profitable line of inquiry might focus on the material remains from similar commercial waterfront sites. With a good research design, well provenienced artifact assemblages and careful review of the documentary sources, it would be possible to reconstruct regional patterns of trade and exchange. For example, there were extensive redware potteries in Charlestown, Massachusetts during the 17th and

18th century. Apparently, much of this ware was exported from Charlestown itself, but it may have been shipped from Boston as well. Tracing identifiable examples of this ware provides a means for reconstructing the economic and social network through which these materials moved. Since water-borne transportation was the primary means for shipping quantities of merchandise, waterfront sites play an important role in this kind of reconstruction. This is especially the case since materials which were damaged during shipment were often discarded at waterfront locations.

A second strategy for analysis of waterfront fill sites is to compare them with the other kinds of archaeological remains which occur within the adjacent community. Fill sites are useful for understanding land use and development over time. To interpret them fully, however, it is essential to have information from other archaeological contexts such as domestic sites, wells, privies, trash pits, and commercial sites. With this kind of complementary site data, patterns of community growth and evolution (social and economic as well as physical) can be addressed.

Questions have been raised about the utility of studying fill deposits. Certainly there is no question that large fill episodes by themselves are difficult to interpret. On the other hand, I see no more problem in attempting to reconstruct "community" behavior by studying fill deposits than I do in trying to interpret a "household" based on examination of the trash pits. The differences lie in scale and complexity rather than kind.

Management Recommendations

From a management perspective, the Bostonian Hotel site points up several important lessons. The first is that despite three centuries of intense urban activity, significant archaeological remains do survive. This is hardly a revelation in cities where archaeology has been taken seriously. It is, however, news in Boston. This project represents the first time that Colonial period remains in Boston proper

have received any serious archaeological study. Considering that Boston has perhaps the best archaeological potential of any city in the East, this is hardly a record of which we can be proud.

Despite this, there is still considerable reason for optimism. Boston has lost a good deal of its archaeological potential, much of it within the past ten to twenty years, and continues to lose more as the pace of current development accelerates. Yet, Boston also has much more in terms of historical resources than do most other cities. Within its present corporate boundaries, Boston encompasses four of Massachusetts' earliest towns: Charlestown, Dorchester, Roxbury, and of course, Boston itself. Each of these areas still holds potential for archaeological sites of major importance.

All this underscores the urgent need to identify where archaeological sites survive in Boston, to evaluate which of these are most significant and to devise and implement plans for their protection. In short, Boston needs a plan which will allow the city both to protect and utilize its unique archaeological heritage, instead of continuing to squander it. This is the first recommendation: that the city, through the Boston Landmarks Commission, initiate an Archaeological Master Plan. Such a plan should identify the most sensitive areas of the city, paying special attention to parcels on which development is anticipated.

In order to do an Archaeological Master Plan, the city will need an archaeological professional on staff. This is the second recommendation: that the city hire an archaeologist with expertise in urban sites, who can assist in drafting the Archaeological Master Plan, and work with other city departments and commissions to minimize the unnecessary destruction of important sites. A city archaeologist could also work with private developers so that future salvage operations on sites like the Bostonian Hotel can be handled in a systematic, controlled manner.

While the Bostonian Hotel site is important for the information it reveals on 17th and 18th century Boston, its real importance lies in its bringing archaeology into the public view. Hopefully, the site will be remembered not just as an interesting episode in the study of the city's past, but as the beginning of serious archaeological inquiry in Boston.

APPENDIX A

Chemical Analysis of Soil Samples from the Bostonian Hotel Site

Patricia McDowell
Department of Geography
University of Oregon

APPENDIX A

Batch 1						
Profile	B					
Sample number	1	2	3	4	5	6
Depth (feet)	6	7'2"	8	9	10	11
pH	6.2	6.7	6.8	7.3	7.1	7.1
P	7	0	22	82	9	10
K	160	145	298	460	208	538
Ca	3031	3328	3104	3015	2895	4167
Mg	358	344	439	658	495	1124
Bo	2.8	4.8	4.5	5.3	9.9	16
Cu	20	0.8	19	2.1	0.9	2.4
Mo	0.1	0.1	0.1	0.1	0.1	0.1
Fe	60	2.4	2.3	0.2	12	15
Zn	25	7.5	38	38	8.4	19
Mn	8.9	22	38	145	9.9	14
Al	26	2	6	1	13	17
As	0	0	0	0	0	0
Pb	12	8	68	8	11	19

All chemical data measure available concentration in parts per million.

Batch 1

Profile	K	K	K	L	L	L	L
Sample no.	6	3	1	1	4	5	6
Depth (ft)	1'6"	5'	7'	1'	4'	5'	5'10"
pH	6.6	6.6	6.9	7.3	6.1	5.0	5.6
P	14	25	9	12	2	10	6
K	184	216	334	142	466	954	1329
Ca	2944	2654	2939	2508	963	6677	4676
Mg	114	280	401	199	122	859	898
Bo	0.6	3	4.8	0.7	1.3	11	18
Cu	11	6.7	0.5	2.3	0.6	0.1	0.1
Mo	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Fe	37	7	2.1	12	108	280	79
Zn	37	13	9.1	26	0.4	0.6	0.1
Mn	1.8	36	41	6.1	38	85	107
Al	9.0	9.0	7.0	15	24	176	71
As	0	0	0	0	0	1.0	1.0
Pb	19	23	19	27	2	2	2

Batch 2

Profile	D	D	D	D	D	F	F
Sample no.	3	4	5	6	7	1	3
Depth (ft)						6'	10'6"
pH	7.1	7.3	6.1	6.8	6.8	6.6	6.3
P	0	0	0	2.3	0	9.3	2.4
K	48	83	37	71	7.4	41	9.4
Ca	8499	8475	8484	8487	8466	3567	8499
Mg	498	367	417	628	604	251	257
Bo	3.4	2.4	2.0	4.7	4.6	1.5	2.6
Cu	2.5	0	0	0	1.1	173	11
Mo	0.1	0.1	0.1	0.2	0.1	0.1	0.1
Fe	5.0	5.9	86	3.0	2.1	12	106
Zn	5.6	0.7	2.6	30	11	29	60
Mn	39	17	45	107	128	18	70
Al	13	22	98	5.8	5.1	16	13
As	0.1	0.4	0.7	0.1	0.3	0.2	0.1
Pb	80	9.2	3000	1152	84	286	188

APPENDIX B

Mammalian Faunal Remains from the Bostonian Hotel Site

Gwilym Jones
Department of Biology
Northeastern University

Profile A, Level 3

Bos taurus (domestic cow): total - 4
- metatarsal - 2
- metacarpal - 1
- metatarsal (calf) - 1

Ovis aries (sheep): total - 1
- mandible - 1

bird (medium-sized): total - 1
- tibia - 1

Profile A'

Bos taurus: total - 4
- radius (calf) - 1
- metatarsal (calf) - 1
- tibia (calf) - 1
- scapula fragment (calf) - 1

large mammal, probably Bos: total - 1
- long bone fragment - 1

Profile C, Level 4

Bos taurus: total - 1
- rib fragment - 1

Capra hircus? (goat): total - 1
- metatarsal - 1

bird (crow-sized): total - 1
- ulna - 1

Profile C, Level 5

Capra hircus: total - 1
- humerus - 1

Profile C, Level 6

Bos taurus: total - 13
- cranium fragments with teeth - 2
- cranium fragments (large) - 3
- articular process mandible fragment - 1
- humerus - 2
- astragalus - 1
- metatarsal - 1
- rib - 1
- calcaneus (calf) - 2

large mammal, probably Bos: total - 2
- long bone fragment - 1
- cranium fragment - 1

Ovis aries: total - 1
- tibia - 1

Sus scrofa (pig): total - 2
- humerus - 1
- radius - 1

Procyon lotor (racoon): total - 1
- humerus - 1

large bird (goose?): total - 2
- long bone - 2

Profile D, Level 7

Bos taurus: total - 1
- humerus fragment - 1

Profile D, disturbed context

Bos taurus: total - 1
- vertebra - 1

large mammal, probably Bos: total - 3
- rib fragment - 1
- fragments - 2

Ovis aries: total - 2
ribs - 2
Sus scrofa: total - 2
pelvis fragment - 1

Profile F, Level 3
Bos taurus: total - 1
vertebra fragment - 1
large mammal, probably Bos: total - 1
femur fragment - 1
large fish - 1

Profile F, Level 3 backdirt
Bos taurus: total - 3
cranium fragment - 1
tibia fragment - 1
humerus (calf) - 1
Ovis aries: total - 6
femur - 1
tibia - 1
humerus - 1
ulna - 1
metacarpal - 1
metatarsal - 1
Ovis aries (?): total - 1
vertebra fragment - 1
Sus scrofa: total - 6
scapula - 1
pelvis fragment - 3
ulna - 1
phalanx - 1
Capra hircus: total - 2
metacarpal - 1
metatarsal - 1
Felis catus (domestic cat): total - 2
femur - 1

scapula - 1

large bird (goose?) - 3

very large bird (turkey?) - 3

Profile K, Level 6

Ovis aries: total - 1

rib fragment - 1

Ovis/Capra: total - 3

rib fragment - 2

vertebra fragment - 1

Sus scrofa: total - 1

phalanx - 1

Sus scrofa (?): total - 2

vertebra fragment - 1

pelvis fragment - 1

small bird (duck?) - 2

fish - 20

Profile K, backdirt

Bos taurus: total - 20

cranium fragment (zygmatic process) - 1

cranium fragments (calf) - 3

mandible fragments - 2

atlas - 1

vertebra fragment - 2

rib fragments - 5

ulna, proximal end - 1

pelvis fragment - 1

femur, distal end - 1

tibia, proximal end - 1

tibia fragment (calf) - 1

metatarsal - 1

large mammal, probably Bos - 2

Ovis aries: total - 13

cranium fragments - 3

scapula - 1

humerus - 1
metacarpal fragment - 1
rib fragments - 2
pelvis fragments - 3
tibia fragment - 1
phalanx - 1

Sus scrofa: total - 1
humerus - 1

Odocoileus virginianus (white-tailed deer): total - 1
mandible, posterior portion - 1

medium bird (chicken?) - 1

APPENDIX C

Analysis of Molluscan Remains from the Bostonian Hotel Site

Russell Barber
Institute for Conservation Archaeology
Harvard University

Introduction

This report documents the identification and analysis of molluscan remains recovered during archaeological study of the Bostonian Hotel site (BOS-5) in Boston, Massachusetts. The specimens were collected and submitted for analysis by Dr. James Bradley of the Massachusetts Historical Commission.

The specimens studied were removed from four contexts. Those from Profile B, level 4 (SS6), Profile C, level 6, and Profile K level 6 (SSl) are believed to date from the early 18th century; those from Profile F, level 3 are believed to be later, probably late 18th century.

It is assumed that all of the shells analyzed came to their sites of discovery through natural processes rather than human intervention. Accordingly, the primary goal of this analysis has been the reconstruction of the environment which supported the creatures in life. The detail in which that reconstruction has been drawn has been limited by the nature of the data, which are few and potentially biased by recovery techniques. Nonetheless, conclusions can be drawn.

Identification

Table 1 summarizes the identifications of molluscan remains per provenience. To be counted in Table 1, a shell needed to include the umbo or "hinge" (for bivalves) or spire (for snails). If this criterion were not in force, differential fragmentation could distort true relative frequencies. For snails, the numbers in Table 1 are minimum numbers of individuals; for bivalves, the numbers are about twice the minimum numbers of individuals. It should be remembered, however, that these relative frequencies are probably as much an artifact of collection procedures as an index of true frequencies in the deposits.

All the species identified are presently found in the vicinity of Boston Harbor, and no range extensions are necessary. All are marine species that could have lived in Boston Harbor.

Environmental Reconstruction

Table 2 summarizes environmental tolerances and preferences for the species identified. On the basis of these data, basic conclusions can be drawn.

For the earlier deposit (Profile B, level 4, Profile C, level 6, and Profile K, level 6), two environments are definitely indicated. First, Nassarius trivittatus, Geukensia demissa, Lunatia heros and Macoma balthica indicate a muddy harbor bottom; Mya arenaria, in such small quantities as implied here, probably also indicates this environment. Second, Lacuna vincta, Mytilus edulis, Nucella lapillus and Crassostrea virginica all indicate a hard, intertidal substrate, such as rocks or wharf pilings.

These inferences support the notion that this area was dredged, then infilled gradually by marine sediments; this scenario would have created the subtidal mud substrate inferred. Further, some form of hard object, probably wharf pilings, extended above the low tide mark. (Rocks probably would have been removed or buried during dredging.)

The later deposit (Profile F, level 3) was represented by only a single specimen, and any inference is tentative. Nucella lapillus is a predator living mostly on periwinkles; it usually is found in greatest numbers from Cape Ann northward, where rocky, high energy beaches abound. The situation is confused by a hole drilled in the shell by a predator, probably a Thaid snail, judging by the hole's size and placement. Considerable erosion of the shell's surface has obscured any microscopic signs which would allow positive identification of the predator. This matter is of some consequence. Thaid snails and N. lapillus share an intertidal niche. If the predation hole were from

Thaid activity, this would provide support for the presence of an intertidal, hard substrate at Profile F. On the other hand, shell erosion suggests either mechanical rounding during hydraulic transport or chemical attack by stomach acids in a ground-feeding fish's belly. Either of these sources of erosion implies a secondary deposit. These considerations make inference about the environment at Profile F, level 3 unwise.

Species	Profile B, Level 4 (SS6)	Profile C, Level 6	Profile F, Level 3	Profile K Level 6 (SSl)
Lacuna vincta* (chink shell)	4	-	-	-
Nucella lapillus* (dogwinkle)	-	-	1	1
Nassarius trivittatus*	5	2	-	-
Lunatia hero* (moon shell)	-	-	-	1
Crassostrea virginica (oyster)	2	-	-	1
Macoma balthica	1	-	-	-
Mya arenaria (soft shell clam)	1	-	-	2
Mytilus edulis (blue mussel)	-	4	-	-
Geukensia demissa (ribbed mussel)	-	-	-	1

Table 1. Summary of molluscan remains. Snails indicated by (*).

Species	Environmental Tolerance
Lacuna vincta	intertidal, soft or hard substrate, among rockweed
Nucella lapillus	intertidal, hard substrate, often high energy beaches or pilings
Nassarius trivittatus	subtidal, shallow water, mud substrate
Mytilus edulis	intertidal or (rarely) subtidal in shallow water, hard substrate
Crassostrea virginica	subtidal or intertidal, hard substrate (especially pilings)
Macoma balthica	subtidal, shallow water, mud or sandy mud substrates
Mya arenaria	intertidal or (rarely) subtidal (shallow water), mud substrate, especially mudflats
Geukensia demissa	intertidal or (rarely) subtidal in shallow water, soft substrate, especially mudflats and salt marshes
Lunatia heros	intertidal or subtidal, shallow water, mud substrate

Table 2. Environmental tolerances.

APPENDIX D

Pollen Counts from the Bostonian Hotel Site

Gerald Kelso and
Johanna Schoss
Department of Archaeology
Boston University

Arboreal Pollen Types

Profile	F (ss.2)	K (ss.4)	K (ss.1)	B (ss.6)	D (ss.7)	L (ss.4)
Pinus - total	6	-	10	23	8	87
P. strobus-type	5	-	2	4	5	52
P. resinosa-type	-	-	2	10	-	1
P. banksiana-type	-	-	2	4	2	3
Pinus-type unknown	1	-	4	5	1	31
Picia	-	-	-	-	2	5
Tsuga	-	-	1	1	2	1
Cupressineae	3	-	1	1	4	10
Larix	-	-	-	-	-	1
Abies	-	-	-	1	-	1
Quercus	22	-	11	31	29	25
Betula	10	-	8	12	6	1
Acer rubrum-type	-	-	1	-	1	-
Acer saccharum-type	-	-	-	5	1	-
Alnus	1	-	6	-	-	-
Corylus	-	-	-	2	2	-
Celtis	-	-	1	-	1	-
Humulus	-	-	-	-	1	-
Oystrya/Carpinus	-	-	1	-	-	-
Cornus racemosa-type	-	-	1	-	-	-
Cornus canadensis-type	1	-	-	-	-	-
Tilia	-	-	1	1	-	-
Carya	1	-	2	1	9	12
Platnus	-	-	2	1	-	-
Fagus	-	-	2	3	-	-
Morus	-	-	3	1	-	-
Fraxinus	1	-	1	-	-	-
Ulmus	-	-	-	1	1	-
Castanea	2	-	1	4	1	-
Populus	2	-	16	2	4	3
Robinia	-	-	1	-	-	-

Profile	F (ss.2)	K (ss.4)	K (ss.1)	B (ss.6)	D (ss.7)	L (ss.4)
Viburnum cassinoides -type	3	-	-	-	-	-
Viburnum edule-type	-	-	-	2	-	-
Rhamnus	-	-	1	-	30	-
Rhamnaceae cf. Ceanothus	-	-	4	-	-	-

Non-Arboreal Pollen Types

Profile	F (ss.2)	K (ss.4)	K (ss.1)	B (ss.6)	D (ss.7)	L (ss.4)
Cheno-Ams	-	-	1	4	3	1
Compositae						
Artemisia	-	-	1	1	4	-
low-spine	10	2	8	21	37	9
high-spine	10	-	5	4	9	-
Liguliflorae	1	-	1	1	2	1
Gramineae	74	-	75	37	22	5
Cereale	2	-	8	5	3	-
Equisitum	-	-	1	-	-	1
Cyperaceae	1	-	-	2	1	26
Typha-dyads	-	-	-	-	-	2
Leguminoseae	1	-	-	-	-	-
Solanaceae	8	-	10	5	3	-
Umbelliferae	4	-	-	-	3	-
Ranunculaceae	1	-	-	3	1	-
Rosaceae	1	-	-	-	1	-
Cruciferae	-	-	1	-	-	-
Nyctaginaceae	-	-	-	-	-	3
Plantago	-	-	1	-	1	-
Ilex/Nemophantus	-	-	2	-	-	-
Rumex	-	-	1	-	-	-
Thalictrum	2	-	-	1	1	2
Undetermined -Type "A"	17	-	7	1	3	-
Undetermined AP & NAP	16	-	12	22	4	4
Too degraded to identify	5	-	19	10	20	9
Raw sum - AP & NAP	200	-	207	200	200	200
Influx per gram AP & NAP	3,788	-	5,505	4,902	1,791	6,384

APPENDIX E

Analysis of Three Excavated Mortar Samples from the Bostonian Hotel Site

Dana C. Linck
National Park Service
Denver Service Center

Introduction

Three mortar samples excavated from the Bostonian Hotel site have been analyzed for particle size according to ASTM standards and for percent by weight of solubles and sand and fine particle content. Before digesting the sample in HCl, application of short wavelength ultraviolet light allowed identification of burned shell particles within them. Following sample reduction and with the aid of a 40X binocular microscope, estimates have been made of mineral constituents, degree of particle weathering and types of inclusions present in the insoluble fraction.

A basic assumption of this analysis was that the three samples were from different structures torn down or repaired in widely different time periods. Their archaeological context and small size prevents definite statements of original structural position or function, but some information may be gleaned from their composition, shape and molded impressions. More definitive conclusions may be possible after a larger number of samples are analyzed and viewed in light of their archaeological context.

Summary Analysis

One of the most striking facts revealed by analysis was the similarity of sand within samples 1 and 2. Although the proportion of sand used in sample 2 was over twice that of sample 1, the degree of weathering, range and percentages of mineral constituents and grain size distribution are nearly identical. These similarities are attributable to either long-term use of the same sand source or to structures having been built at about the same time, but torn down decades apart. The rounded sand grains indicate a source originally deposited by water such as a beach or sand bar. One mid 18th century builder is quoted as preferring, next to pit sand, the sand taken from along a fresh water river shore (McKee 1975:65) and these samples may reflect such a preference.

Sand from sample 3 differs significantly in mineral percentages, weathering and in grain size distribution. It also comprised only 4% of the total sample weight and as such is not thought to have been intentional aggregate. If not intentionally a part of the sample, it may have been present with the shells used as the lime source. A sand beach or bar near where one tributary stream joins a larger one might account for the varied grain weathering (Root 1982).

Ultraviolet analysis of samples 2 and 3 before reduction revealed the characteristic vivid yellow fluorescence of partially calcined shell, evidence that shell lime was used in both. Sample 1 from the latest deposit contained no recognizable shell, an absence which may be due to the small sample size or to the availability of natural limestone in the late 18th century (Linck 1983). Although the primary purpose of the burned shell was its source of lime, shells within sample 2 reached a three-quarter inch length and may have served a secondary purpose as aggregate.

Inclusions other than shell need further analysis. The reddish brown hair present in samples 2 and 3 are likely from cattle of Devon or Durham stock. Of itself, hair is not unusual, although its presence generally indicates the sample served as interior plaster rather than exterior mortar (Howell 1983; McKee 1973; Kelly 1963:160).

Roughcast structures constructed after the Boston conflagration of 1679 contained large chunks of dark bottle glass (Cummings 1979:135). The aqua-green flat glass inclusion found within sample 1 might also be considered intentional aggregate, but analysis of additional samples from the same level is necessary before establishing that as fact.

Organic particles need further analysis also and for the present little can be said of them. Some appear to be grass fibers and others root bark fragments. The siliceous fibers and sheaths or platelets are an enigma. Possibly they are exoskeletons of minute sea creatures incidentally gathered with shell used for lime.

Impressions of a dense straw mat in sample 2 may indicate a 17th or early 18th century structure with walls or nogging of clay and straw (Cummings 1979:169; Isham and Brown 1965:198). Little more is safely said without analysis of more and larger samples.

Acknowledgments

The assistance of two employees of the National Park Service, Denver Service Center has been greatly appreciated. William Howell, Historical Architect with the Mid Atlantic/North Atlantic Team, has assisted with methodology and interpretation. Ralph Root, Geologist with the Science and Remote Sensing Branch, performed the general petrographic analysis.

SAMPLE 1 Location: Profile F, level 3

Description

a. Visible Properties Before Testing: Off-white color. No shell, hair, charcoal or vegetable fibers visible. Grainy texture may be due to shell as well as sand. Fragment of aqua-green flat glass within sample. Application of short wave length ultraviolet light produced no fluorescence.

b. Sample Weight (grams): Total: 10.43
Solubles: 3.04 (29%) Sand: 6.87 (66%) Fines: .51 (5%)
Other: .005 (flat glass)

c. Solution Color: Yellow (as sample 2); Fines Color: Grey (5Y 5.5/1)

d. Density: Sand: 1.6

e. Inclusions Present (C-after crushing, F-with fines, S-saved):

Fish Bone(?) -F/S Grass Fibers(?)-F/S Fine Carbon Bits-F/S Bark Bits(?)-F/S Siliceous Fibers and Sheaths-F/S

f. Sieved Sand (% finer than sieve #):

# 3/8"	100
4	100
8	100
16	98
30	89
50	59
100	21
200	5

g. Sand Properties and Minerals:

ca. 90% well rounded quartz sand (volume)
5% well rounded igneous rock fragments
5% traces of sandstone, volcanic rock fragments, ferro-magnesian minerals and carbon bits

Conclusions

More likely a mortar than a plaster due to lack of hair and the highest sand percentage of the three samples.

Lack of visible shell due either to the small sample size or to the use of natural limestone for the lime source.

Sand mineral range and weathering indicate source was likely along a water body (riverside?)

Petrographically is very similar to sample 2.

SAMPLE 2 Location: Profile C, level 5

Description

a. Visible Properties Before Testing: Off-white color. Chunks of shell up to .75" long, also one chunk of charcoal .4" in diameter, a few reddish brown hairs and tan fibers visible. Triangular in X-section with one face troweled coarsely, another face once against stone or smooth brick and the third face with impressions of a dense straw mat. Application of short wavelength UV light produced vivid yellow fluorescence in many particles.

b. Sample Weight (grams): Total: 29.62
Solubles: 19.39 (66%) Sand: 9.0 (30%) Fines: 1.23 (4%)

c. Solution Color: Yellow (as sample 1); Fines Color: Grey-light grey (5Y 6/1)

d. Density: Sand 1.55

e. Inclusions Present (C-after crushing, F-with fines, S-saved)
Reddish brown hairs and black hairs-F/S
Fine carbon bits-F/S Siliceous fibers and sheaths-F/S

f. Sieved Sand (% finer than sieve #):

#	3/8"	100
	4	100
	8	100
	16	97
	30	89
	50	72
	100	36
	200	9

g. Sand Properties and Minerals:

ca. 95% well rounded quartz sand

5% traces of various igneous and ferro-magnesian minerals plus carbonized bits (the minerals also weathered).

Conclusions

More likely a plaster than a mortar due to presence of hair. Yellow fluorescence indicates lime source was calcined shells. Sand weathering and mineral range indicate source was likely along a water body (riverside?) - Note the similarity to sample 1.

SAMPLE 3

Location: Profile D, disturbed context, probably level 7

Description

a. Visible Properties Before Testing: Off-white color - Less gray than samples 1 and 2. One surface appears to have been pressed against brick or stone and the other surface troweled with little care. Many reddish brown hairs and black hairs visible. Also many grayish bits of unknown composition which may be shell. Short wavelength UV light produced vivid yellow fluorescence of many of the grey bits.

b. Sample Weight (grams): Total: 21.67

Solubles: 19.86 (91%) Sand: .8 (4%) Fines: 1.01 (5%)

c. Solution Color: Yellow (darker than #1 and #2)

Fines Color: Dark greyish brown (2.5Y 4/2)

d. Density: Sand .67

e. Inclusions Present (C-after crushing, F-with fines, S-saved)
Black hairs and reddish brown hairs-F/S Bark/root bits-F/S
Siliceous fibers and sheaths-F/S Carbon bits-F/S

f. Sieved Sand (% finer than sieve #):

#	3/8"	100
	4	79
	8	78
	16	69
	30	52
	50	36
	100	25
	200	17

g. Sand Properties and Minerals:

ca. 40% quartz sand both rounded and very angular.
10% carbon bits
50% various volcanic tuff, other igneous types and some sedimentary. Also some fine micro-crystaline fragments - both weathered and angular.

Conclusions

More likely plaster than mortar due to hair presence.

Yellow fluorescence indicates likely source was calcined shell.

The little sand present may not have been intentional and it is petrographically very different from samples 1 and 2.

Angular and weathered sand together indicates source may have been along a river or bay with a small stream outlet nearby. Possibly it is due to sands accidentally gathered with shells mined from a Native American shell midden.

Bibliography

Arnold, C. S. and J. P. Allan
1980 Exeter: Its Clay Tobacco-Pipe Industry and Commercial Relations. In Davey 1980:305-324.

Beebe, Lucie B.
1981 A Graybeard Jug at Fenway Court. Fenway Court 1981 26-33. Isabella Stewart Gardner Museum, Boston.

Benninghoff, W. S.
1942 The Pollen Analysis of the Lower Peat. In The Boylston Street Fishweir. Frederick Johnson (ed.) Papers of the Robert S. Peabody Foundation for Archaeology. Phillips Academy, Andover, Mass. 2: 97-104.

1962 Calculation of Pollen and Spores Density in Sediments by Addition of Exotic Pollen in Known Quantities. Pollen et Spores. Paris 6(2):332-333.

Bimson, Mavis
1970 The significance of 'Ale-Measure' Marks. Post-Medieval Archaeology 4:165-66.

Bolt, G. H. and M. G. M. Bruggenwert, eds.
1978 Soil Chemistry, Part A: Basic Elements (2nd edition). Elsevier Scientific Publishing Company, Amsterdam.

Bonny, A. P.
1976 Recruitment of Pollen to the Seston and Sediment of Some Lake District Lakes. Journal of Geology 64:858-887.

Boston, City of
1877 Second Report of the Record Commissioners. City Printers, Boston.

1890 Twenty-second report of the Record Commissioners: statistics of the United States' Direct Tax of 1798, as assessed in Boston. City Printers, Boston.

Boston Directory
1798 Boston Directory. John West, Boston.

Boston Landmarks Commission
1983 Blackstone Block Street Network. Study report for potential Landmark designation.

Bowditch, Nathaniel Ingersoll
n.d. Records of land titles. Manuscript in N. I. Bowditch Collection, Massachusetts Historical Society, Boston.

Bower, Beth Anne, Claire Dempsey and Stephen Mrozowski
n.d. Long Wharf: Archaeological Testing at Parcel D-10. Draft report, Massachusetts Historical Commission.

Bradley, James W.
1979 The Onondaga Iroquois, 1500-1655: A Study in Acculturative Change and its Consequences. Syracuse University, University Microfilms, Ann Arbor, Michigan.

Brush, G. S. and L. M. Brush, Jr.
1972 Transport of Pollen in a Sediment-Laden Channel: A Laboratory Study. American Journal of Science 272:359-381.

Butler, P.
1959 Palynological Studies of Barnstable Marsh, Cape Cod, Massachusetts. Ecology 40:735-737.

Clough, Samuel C.
1919 Remarks and map. Publications of the Colonial Society of Massachusetts 21:251-253.

1922 Remarks and map. Publications of the Colonial Society of Massachusetts 25:43-47.

1927 Remarks on the Compilation of the Boston Book of Possessions. Publications of the Colonial Society of Massachusetts 27:6-21.

Cook, S. F. and R. F. Heizer
1965 Studies on the Chemical Analysis of Archaeological Sites. Univeristy of California Publications in Anthropology, No. 2.

Crowder, A. A. and D. G. Cuddy
1973 Pollen in a Small River Basin: Wilton Creek, Ontario. Quantitative Plant Ecology. In Quaternary Plant Ecology, H. G. J. Birks and R. G. West, eds. Wiley-Interscience, New York:61-77.

Cummings, Abbott Lowell
1979 The Framed Houses of Massachusetts Bay, 1625-1725. Belknap Press of Harvard University Press, Cambridge.

n.d. Decorative Painters and House Painting at Massachusetts Bay, 1630-1725. Unpublished excerpts.

Davey, Peter, ed.
1980 The Archaeology of the Clay Tobacco Pipe (Vol. III), Britain: The Worth and West. BAR British Series No. 78.

Davidson, D. A. and M. L. Shackley, eds.
1976 Geo-Archaeology, Earth Science and the Past. Westview, Boulder, Colorado.

Davis, M. B.
1959 Three Pollen Diagrams from Central Massachusetts. American Journal of Science 256:540-470.

1969 Climatic Changes in Southern Connecticut Recorded by Pollen Deposition at Rogers Lake. Ecology 50(3): 411-422.

Davis, M. B., L. B. Brubaker and J. M. Beiswenger
1971 Pollen Grains in Lake Sediments: Pollen Percentages in Surface Sediments from Southern Michigan. Quaternary Research 1(4):450-467.

Davis, R. B.
1967 Pollen Studies of Near-Surface Sediments in Maine Lakes. In Quaternary Paleoecology. E. J. Cushing and H. E. Wright, Jr., eds. Yale University Press, New Haven: 143-173.

Davis, R. B., T. E. Bradstreet, R. Stuckenworth, Jr. and H. W. Bornes, Jr.
1975 Vegetation and Associated Environments During the Past 14,000 Years Near Moulton Pond, Maine. Quaternary Research 5:435-465.

Deevey, E. S., Jr.
1939 Studies on Connecticut Lake Sediments. I. A Postglacial Climatic Chronology for Southern New England. American Journal of Science 237:691-724.

1948 On the Date of the Last Rise of Sea Level in Southern New England, With Remarks on the Grassy Island Site. American Journal of Science 246:329-352.

Dixon, Philip
1975 Excavations at Richmond Palace, Survey. Post Medieval Archaeology 9:103-116.

Fairbanks, Jonathan L. and Robert F. Trent
1982 New England Begins: The Seventeenth Century, 3 vols. Museum of Fine Arts, Boston.

Fall, Patricia L.
1981 Modern Pollen Spectra and Their Application to Alluvial Pollen Sedimentology. M.A. Thesis, Department of Geosciences, University of Arizona, Tucson.

Goldberg, Zoino, Dunnicliff and Associates, Inc.
1980 Final Subsurface Investigation Proposed Hotel, North End, North and Blackstone Streets, Boston, Massachusetts. File No. G-2379, Newton Upper Falls, Massachusetts.

Gomez-Ibanez, Miguel
1977 Preserving Three Hundred Fifty Years of Change in the Blackstone Block. Old-Time New England 68:19-31.

Griffith, M. A.
1981 A Pedological Investigation of an Archaeological Site in Ontario, Canada, II. Use of Chemical Data to Discriminate Features of the Benson Site. Geoderma 25:27-34.

Griselda, Lewis
1969 A Collector's History of English Pottery. Viking Press, New York.

Harlow, William M.
1957 Trees of Eastern and Central United States and Canada. Dover Publications, Inc., New York.

Harrington, Faith
n.d. The Follett Site Excavation. Draft Report, Strawberry Banke Museum, Portsmouth, New Hampshire.

Huesser, L. and W. L. Balsam
1977 Pollen Distribution in the Northeast Pacific Ocean. Quaternary Research 7:45-62.

Isham, Norman M. and Albert F. Brown
1965 Early Connecticut Houses. Dover Publications, Inc., New York. First printing in 1900 by the Preston and Rounds Company.

Iverson, J.
1941 Landnam i Danmarks Stenalder. Damn, Goel. Unders. Kobenhaven 2(66):1-68.

Jacobs, Alan
1976 17th Century Dutch and Flemish Painters: A Collector's Guide. McGraw Hill, New York.

Kaye, Clifford
1976 The Geology and Early History of the Boston Area of Massachusetts. U. S. Government Printing Office, Washington, D.C.

Kaye, Clifford A. and Elso S. Barghoorn
1964 Late Quaternary Sea-Level Change and Crustal Rise at Boston, Massachusetts, with Notes on the Autocompaction of Peat. Geological Society of America Bulletin 75:63-80.

Keeler, R. W.
1977 The Homelot on the Seventeenth Century Chesapeake Tidewater Frontier. Unpublished Ph.D. Thesis, University of Oregon, Eugene.

Kelly, Frederick J.
1963 Early Domestic Architecture of Connecticut. Dover Publications, New York. First printing in 1924 by Yale University Press.

King, J. E., W. L. Klippel and R. Duffield
1975 Pollen Preservation and Archaeology in Eastern North America. American Antiquity 40(2):180-190.

Knox, A. S.
1942 The Pollen Analysis of the Silt and the Tentative Dating of the Deposits. In The Boylston Street Fishweir, Frederick Johnson, ed. Papers of the Robert S. Peabody Foundation for Archaeology. Phillips Academy, Andover, Massachusetts 2:105-129.

Limbrey, S.
1975 Soil Science and Archaeology. Academic Press, New York.

Linck, Dana C.
1983 Ultraviolet Light as an Aid in the Archeological Laboratory. Paper presented at the XVIth annual meeting of the Society for Historical Archaeology, Denver.

McAndrews, J. H., A. A. Berti and G. Norris
1973 Key to the Quaternary Pollen and Spores of the Great Lakes Region. Life Sciences Miscellaneous Publications, Royal Ontario Museum, Toronto.

McKee, Harley J.
1973 Introduction to Early American Masonry, Stone, Brick, Mortar and Plaster. National Trust/Columbia University Series on the Technology of Early American Buildings, 1. National Trust for Historic Preservation and Columbia University.

Mehringer, P. J., Jr.
1967 Pollen Analysis of the Tule Springs Area, Nevada. In Pleistocene Studies in Southern Nevada. H. M. Wormington and D. Ellis, eds. Nevada State Museum Anthropological Papers, Carson City 13(3):120-200.

Meyer, E. R.
1973 Late-Quaternary Paleoecology of the Cuatro Cienegas Basin, Coahuila, Mexico. Ecology 54(5):982-995.

Muller, J.
1959 Palynology of Recent Orinoco Delta and Shelf Sediments. Micropaleontology. 5:1-32.

Noel Hume, Ivor
1977 Early English Delftware from London and Virginia. University Press of Virginia, Charlottesville, Virginia.

Omwake, H. G.
1958 Kaolin Pipes from the Schurz Site. Bulletin of the Archaeological Society of Connecticut 29:3-13.

Oswald, Adrian
1975 Clay Pipes for the Archaeologist. British Archaeological Reports 14, Oxford, England.

Raynor, G. S., E. C. Ogden and J. V. Hayes
1973 Dispersal of Pollens from Low-Level, Crosswind Line Sources. Aqricultural Meterology 9:177-195.

Richard, P.
1970 Atlas Pollinique des Arbres et de Arbustes Indinenes du Quebec. Le Naturaliste Canadien 97(1-3):1-306.

Seasholes, Nancy
n.d. History of Land Use of Open Area at Rear of Wilkinson Hardware Store, Union Street, Boston, Massachusetts. Manuscript, Massachusetts Historical Commission.

Shurtleff, Nathaniel B.
1890 A Topographical and Historical Description of Boston (3rd Edition). City Printers, Boston.

Small, Edwin W.
1970 Early Wharf Building. National Park Service, Salem Maritime National Historic Site. Reprint of 1941 edition. Newcomb and Gauss Company, Salem, Massachusetts.

Smith, Robert C.
1968 The Art of Portugal, 1500-1800. Meredith Press, New York.

Solomon, A. M. and D. F. Kroener
1971 The Effects of Urban Development on Airborne Pollen: Pollen Deposited in Reservoir Muds. Bulletin of the New Jersey Academy of Sciences 15(1-2):30-44.

Sopko, Joseph S.
1982 an Analysis of Dutch Bricks from a 17th century Structure Within the Site of Fort Orange at Albany, New York. New York State Parks, Recreation and Historic Preservation, Bureau of Historic Sites, Waterford, New York.

South, Stanley
1977 Method and Theory in Historical Archaeology. Academic Press, New York.

Suffolk Deeds
Registry of Deeds. Suffolk County Courthouse, Boston, Massachusetts.

Thwing, Annie Haven
1916a Suffolk Deed, 1630-1800. Typescript. Massachusetts Historical Society, Boston.

1916b Inhabitants and estates of the town of Boston, 1630-1800. Volume 1, Introduction and miscellaneous records. Typescript. Massachusetts Historical Society, Boston.

1920 The Crooked and Narrow Streets of the Town of Boston, 1630-1822. Marshall Jones, Boston.

Traverse, A. and R. N. Ginsburg
1966 Palynology of the Surface Sediments of Great Bahama Bank, as Related to Water Movement and Sedimentation. Marine Geology 4(6):417-459.

Watkins, Walter Kendall
1921 Three Contracts for Seventeenth Century Building Construction in Massachusetts. Old Time New England XII(1):27-32.

Walker, Iain C.
1971 An Archaeological Study of Clay Pipes from the King's Bastion, Fortress of Louisburg. Canadian Historic Sites: Occasional Papers in Archaeology and History, No. 2.

Whitehill, Walter Muir
1968 Boston, A Topographical History (Second edition). Belknap Press of Harvard University Press, Cambridge, Massachusetts.

Willard, Margaret Wheeler
1925 Letters on the American Revolution. Reissued 1968. Kennikat Press, Port Washington, New York.

Winsor, Justin
1881 Memorial History of Boston. 2 volumes. Ticknor, Boston.

Wodehouse, R. P.
1971 Hay Fever Plants. Hafner Publishing Company, New York.

Wright, Christopher
1978 The Dutch Painters: One Hundred 17th Century Masters. Barron's, Woodbury NY.

This publication has been funded with the assistance of a matching grant-in-aid from the Department of Interior, National Park Service, under the provisions of the National Historic Preservation Act of 1966.

Massachusetts Historical Commission

Occasional Publications in Archaeology and History:

No. 1 *An Archaeological Survey and Documentary History of the Shattuck Farm,* Andover, Massachusetts.
Stephen Cole, editor.
March, 1981

No. 2 *Archaeology of the Bostonian Hotel Site*
James W. Bradley, editor.
April, 1983

MASSACHUSETTS HISTORICAL COMMISSION

294 Washington Street
Boston, MA 02108
(617) 727-8470

Valerie A. Talmage
Executive Director